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San Diego Association of Governments
California Department of Transportation, District 11

ECONOMIC IMPACTS OF WAIT TIMES AT THE CALIFORNIA – MEXICO BORDER 2009 UPDATE

Final Report

January 2010

HDR | Decision Economics

ECONOMIC IMPACTS OF WAIT TIMES AT THE CALIFORNIA – MEXICO BORDER 2009 UPDATE

FINAL REPORT

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EXECUTIVE SUMMARY

In 2004, the San Diego Association of Governments (SANDAG) in partnership with the California Department of Transportation (Caltrans) engaged HDR Decision Economics (HDR) to assess the economic impacts of delays at the San Diego – Baja California land ports of entry for both personal trips and commercial traffic. A similar analysis was conducted for the Imperial Valley Association of Governments (IVAG) shortly after. At the time, the study was prompted by the tightening of border security amid concerns it could adversely affect the cross-border economy. The study concluded that increasing delays at the border could significantly hinder economic growth in the border region.

The present report provides an update of the study results for 2008.

Estimates and projections of economic impacts associated with delays at all ports of entry along the California / Mexico border are presented in Table ES-1 below.

Table ES-1: Economic Impacts of Delays at California Ports of Entry

	SAN DIEGO & IMPERIAL COUNTIES		CALIFORNIA		UNITED STATES		BAJA CALIFORNIA		MEXICO	
	In 2008	In 2017	In 2008	In 2017	In 2008	In 2017	In 2008	In 2017	In 2008	In 2017
FREIGHT FLOWS										
Total Output Losses	-$470	-$696	-$943	-$1,398	-$1,666	-$2,469	-$1,169	-$1,732	-$1,837	-$2,722
Total Employment Losses	-2,532	-3,751	-4,892	-7,248	-10,266	-15,212	-5,467	-8,101	-8,592	-12,731
Total Labor Income Losses	-$131	-$195	-$263	-$390	-$458	-$678	-$130	-$192	-$204	-$302
PERSONAL TRIPS										
Total Output Losses	-$1,997	-$2,901	-$2,267	-$3,292	-$2,267	-$3,292	-$277	-$397	-$289	-$413
Total Employment Losses	-19,961	-28,989	-20,097	-29,185	-20,097	-29,185	-2,168	-3,102	-2,258	-3,227
Total Labor Income Losses	-$820	-$1,192	-$913	-$1,326	-$913	-$1,326	-$45	-$64	-$46	-$66
TOTAL										
Total Output Losses	**-$2,467**	**-$3,597**	**-$3,211**	**-$4,690**	**-$3,934**	**-$5,762**	**-$1,446**	**-$2,129**	**-$2,126**	**-$3,134**
Total Employment Losses	**-22,493**	**-32,740**	**-24,989**	**-36,433**	**-30,363**	**-44,397**	**-7,635**	**-11,203**	**-10,849**	**-15,957**
Total Labor Income Losses	**-$952**	**-$1,386**	**-$1,176**	**-$1,716**	**-$1,371**	**-$2,004**	**-$174**	**-$256**	**-$250**	**-$368**

Source: HDR analysis

Overall, we estimate that over 30,000 jobs were lost nationwide due to delays at the California / Mexico border in 2008, including 25,000 in California alone. The impacts of delays were also significant on the other side of the border, with over 11,000 jobs lost in Mexico, including 7,600 in Baja California. By 2017, under conservative growth projections, nearly 45,000 jobs could be lost in the United States; and 16,000 in Mexico.

These impacts, although sizeable, are somewhat *lower* than those estimated in our earlier studies. We attribute this decline to the reduction in the number of border crossings associated with the economic recession,[1] along with revisions in some of the assumptions used in our analysis (including changes in expected wait times for northbound commercial vehicles).

As part of this study, a number of improvements were also made to the economic impact analysis tools developed in 2004.

In particular, the original freight and personal trip computer models created for SANDAG and IVAG were merged into a single spreadsheet-based application to facilitate policy analysis and "what if" scenario testing.

[1] The number of cross-border personal trips in 2008 was 20 percent lower than in 2005.

The updated tools also provide more flexibility for users to simulate the impact of various socio-economic variables on the volume of cross-border trips and expected wait times at the border.

Finally, the expanded tool provides SANDAG and other stakeholders with a means for conducting border-wide analyses of delays and evaluating their cumulative impacts on the economies of San Diego County, Imperial County, California, Baja California and Mexico.

1. INTRODUCTION

In 2004, the San Diego Association of Governments (SANDAG) in partnership with the California Department of Transportation (Caltrans) engaged HDR Decision Economics (HDR) to assess the economic impacts of delays at the San Diego – Baja California land ports of entry for both personal trips and commercial traffic.[2] A similar analysis was conducted for the Imperial Valley Association of Governments (IVAG) shortly after.[3] At the time, the study was prompted by the tightening of border security amid concerns it could adversely affect the cross-border economy. The study concluded that increasing delays at the border could significantly hinder economic growth and result in more than 45 thousand jobs lost in California and Baja California by 2017.

The present report provides an update of the study results for 2008. Border crossing trends in San Diego County and Imperial County have somewhat diverged over the last four years: while passenger crossings have remained essentially flat in Imperial County, they have significantly declined in San Diego County. Changing cross-border travel conditions (e.g., obligation for U.S. citizens traveling to Mexico to present a passport or other documents upon re-entry) led to a re-examination of selected data and relationships among the model variables.

In addition, a number of improvements were made to the economic impact tools. In particular, the original freight and personal trip models developed for SANDAG and IVAG were merged into a single spreadsheet-based application to facilitate policy analysis and "what if" scenario testing.

1.1 Organization of the Report

The report is composed of four chapters. Following this introduction, Chapter 2 provides updated background information on the study area, including historical data on border crossings. The methodology used to estimate the economic impacts of border delays on personal trips and freight movements is described in detail in Chapter 3. The updated study results for 2008 can be found in Chapter 4. Projections up to 2017 are discussed in the Conclusion.

The report also includes a number of appendices. A detailed map of the cross-border region is included in Appendix A. Mexico – California freight data by commodity type for 2008 are presented in Appendix B. A list of modifications made to the original economic impact models is provided in Appendix C. References and data sources used during the course of the study are listed in Appendix D.

[2] HLB Decision Economics Inc., *Economic Impacts of Wait Times at the San Diego–Baja California Border*, prepared for the San Diego Association of Governments and the California Department of Transportation, January 2006.

[3] HDR|HLB Decision Economics, *Imperial Valley – Mexicali Economic Delay Study*, prepared for the Imperial Valley Association of Governments and the California Department of Transportation, August 2007.

2. OVERVIEW OF THE BORDER REGION

This chapter provides an overview of the border region, with a strong focus on the U.S. side. Socioeconomic information for the study area is provided in Section 2.1. Border crossing and trade data are presented in Section 2.2.

2.1 Socioeconomic Background

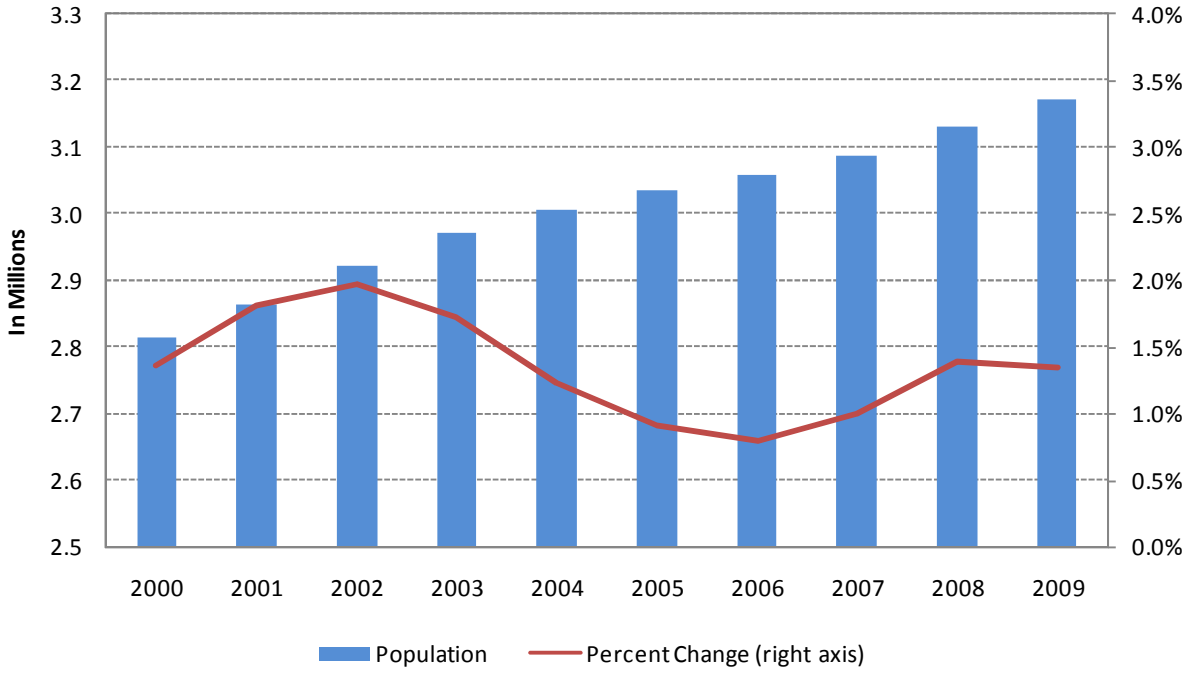
The study area encompasses San Diego County and Imperial County on the U.S. side, as well as the municipalities of Tijuana, Tecate Playas de Rosarito, Mexicali, and the urbanized area of the Municipality of Ensenada in Baja California, Mexico.

Appendix A shows a map of the entire border region, including the six land ports of entry located in California: Otay Mesa (*Mesa de Otay*), San Ysidro (*Puerta México*) and Tecate (*Tecate*) in San Diego County; Calexico West (*Mexicali 1*), Calexico East (*Mexicali 2*) and Andrade (*Algodones*) in Imperial County.[4]

2.1.1 San Diego County

In January 2009, population in San Diego County was estimated at 3.17 million. Since the 2000 Census the county population has increased by 12.8 percent (or 1.3 percent on average annually), which is in line with demographic growth observed at the state level.

Figure 1: San Diego County Population (2000-2009)

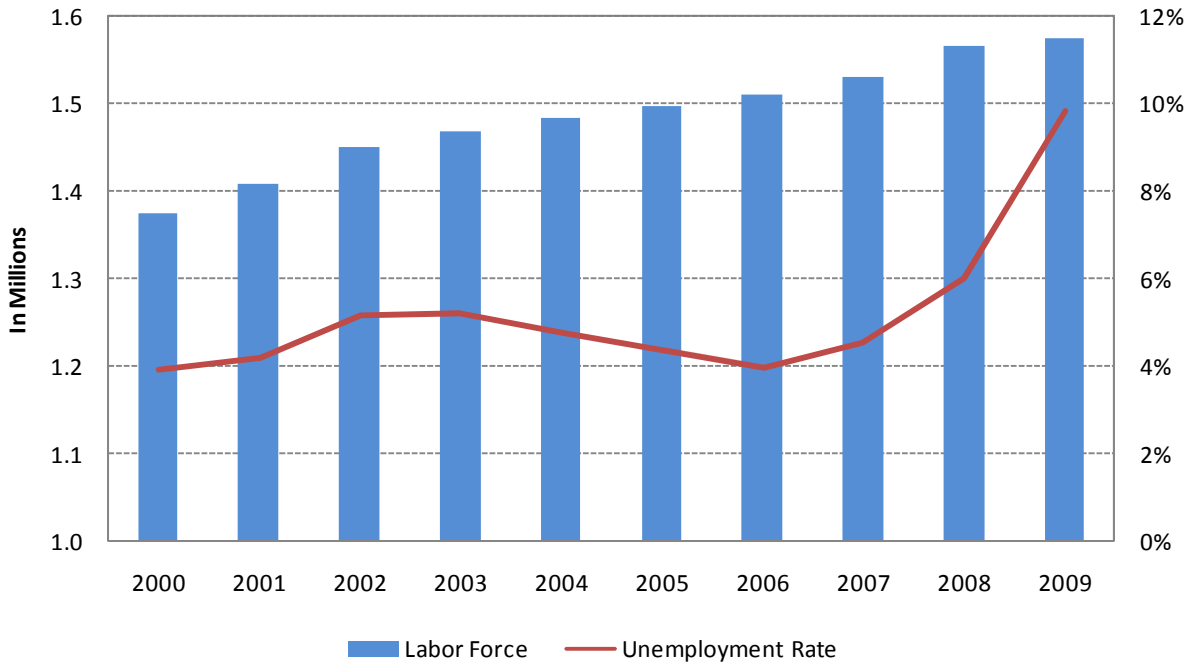


Source: State of California, Department of Finance, E-4 Population Estimates for Cities, Counties and the State, 2001–2009, with 2000 Benchmark. Sacramento, California, May 2009

[4] Mexican POE in parentheses.

Figure 2 shows the labor force and unemployment rate in San Diego County over the 2000 – 2009 period. For the first eleven months of 2009, the county's labor force is estimated at 1.57 million and the unemployment rate averages 9.9 percent. Since 2000 the county labor force has increased by 14.4 percent, because of the dynamism of three sectors in particular: professional and business services, leisure and hospitality, and financial activities. However, this growth came to a sudden halt in 2009 because of the recession. The average annual unemployment rate in San Diego County is bound to top 10 percent next year for the first time in decades.

Figure 2: San Diego County Labor Force and Unemployment Rate (2000-2009)

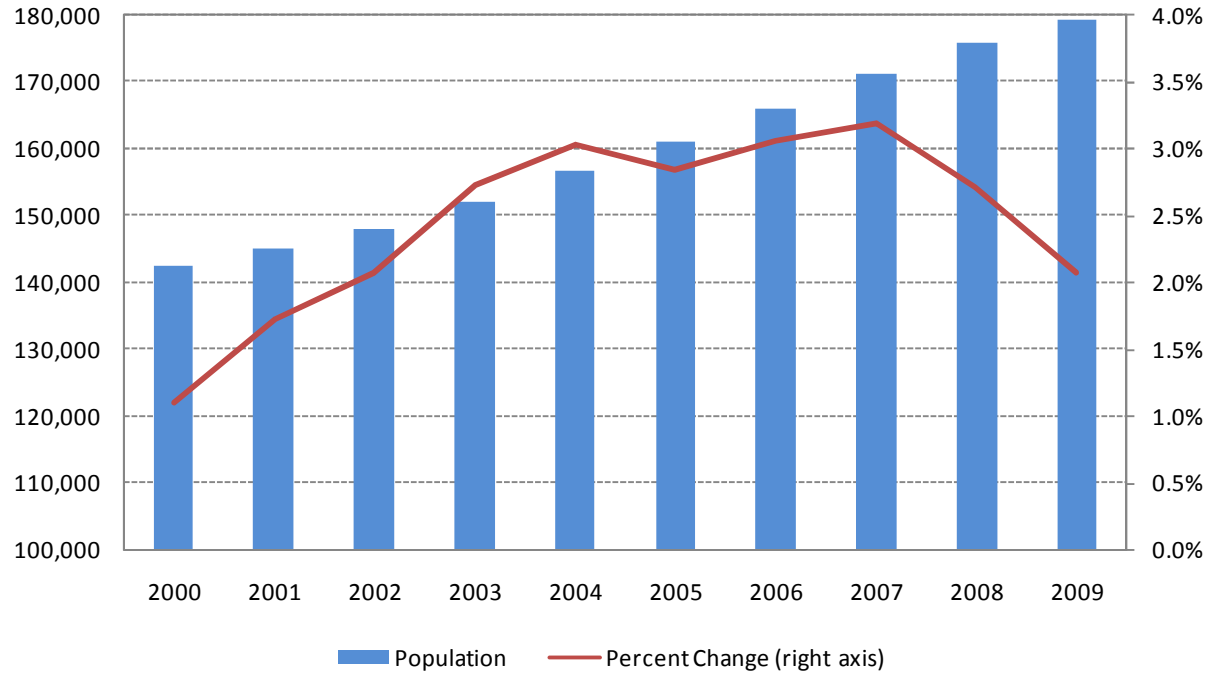


Source: U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics
Note: Estimates for 2009 are averages for the January – November period

2.1.2 Imperial County

At just 0.18 million, Imperial County's population represents only about 5 percent of San Diego county's population. However, recent population growth in Imperial County has been much stronger than in the neighboring county. Since the 2000 Census the population has increased by 25.9 percent (or 2.6 percent on average annually), making Imperial County one of the fastest growing counties in California. Figure 3 shows the county population estimates for the 2000 – 2009 period.

Figure 3: Imperial County Population (2000-2009)

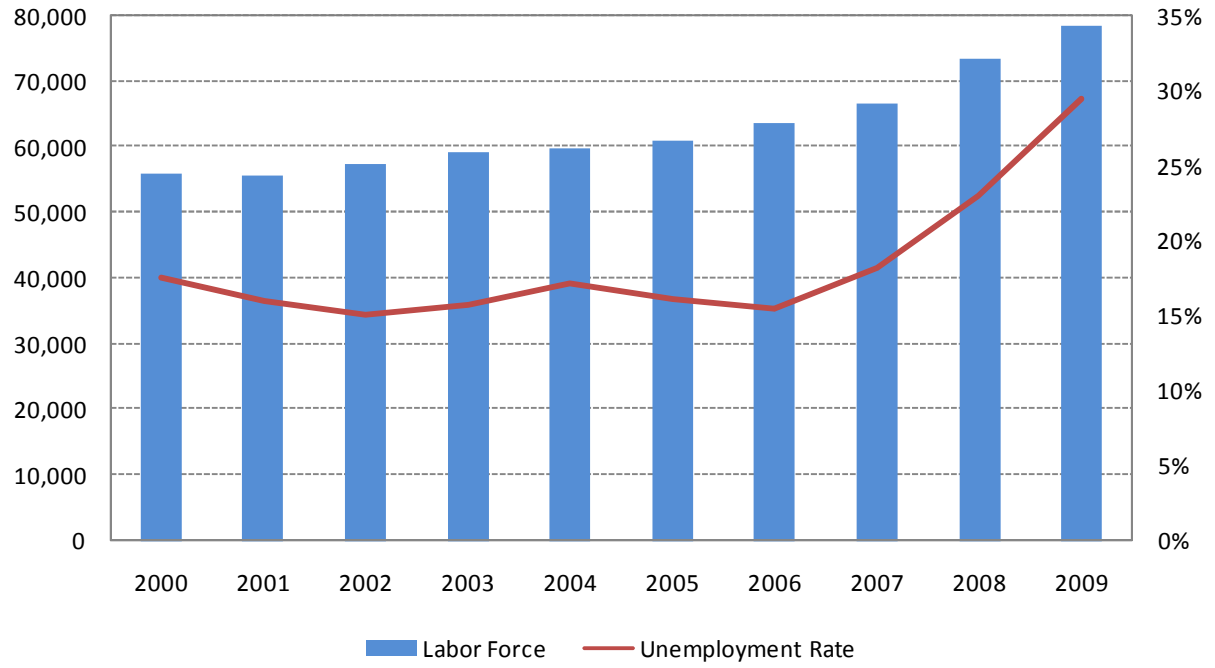


Source: State of California, Department of Finance, E-4 Population Estimates for Cities, Counties and the State, 2001–2009, with 2000 Benchmark. Sacramento, California, May 2009

Figure 4 on the next page shows the labor force and unemployment rate in Imperial County over the 2000 – 2009 period. After stagnating for several years, the county's labor force has been on the rise since 2005 (+28.6 percent). For the first eleven months of 2009, it is estimated at 78,000. Government and agriculture account for about half of total employment in the county.

Due to the significant seasonal agricultural economy, greater variations in employment occur, resulting in consistently high unemployment rates. As of August 2009, Imperial County held the highest unemployment rate in the nation (29.4 percent). The unemployment rate has nearly doubled since 2006 because of the economic recession.

Figure 4: Imperial County Labor Force and Unemployment Rate (2000-2009)



Source: U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics
Note: Estimates for 2009 are averages for the January – November period

2.1.3 Baja California

Baja California's economy has been the fastest growing in Mexico over the last twenty years. Last year, the unemployment rate was only 4.8 percent. Baja California enjoys a relatively high income compared to other Mexican states – the southern states in particular. Economic activity has been spurred by demographic growth (the population of Baja California grew by 14.3 percent from 2000 to 2005).

In 2008, Baja California's gross state product (GSP) originated from the following sectors (in percent of total value): tourism, commerce, restaurants and hotel services (29 percent); other personal services, community and social services (22 percent); manufacturing industry (20 percent); financial and real-estate services (14 percent); and transportation and communication industry (10 percent). According to INEGI, Baja California's GSP grew by 63 percent from 2000 to 2006.

The Government of Baja California has implemented a strategy to develop regionally interrelated industries or "clusters". Clusters are groups of interconnected, export-oriented industries that have potential to bring large resources to the area in which they develop. Industries within a cluster have business transactions with one another and are often vertically and horizontally integrated. Companies in a cluster also compete with each other for market share, driving innovation and productivity. The main industry cluster in Baja California is the airspace industry. This strategy has proven to be extremely effective in terms of growth and development, leading the State of Baja California to be the second largest growing in Mexico. The Government of Baja California adopted this strategy largely because of the success of the County of San Diego when

it started developing clusters in the early nineties, as well as the close economic links that the two entities has. The County of San Diego still follows this cluster strategy and Imperial County is currently developing a cluster policy along these same lines.[5]

The Maquiladora industry has also been a leading sector in Baja California, especially since the enactment of the North American Free Trade Agreement (NAFTA) in 1994 (see Table 1). Maquiladoras are assembly factories that manufacture imported inputs into different products for export. The industry is closely interlinked in terms of transportation and trade to San Diego and Imperial Counties. Maquiladoras are mostly owned by U.S. and Asian corporations that are attracted to Baja California because of low labor costs, the tax incentives and proximity to the U.S. market. However, their contribution to cross-border freight movements cannot be quantified precisely due to data limitations. Congestion at the border could penalize Maquiladoras disproportionately, as the added travel time could erode part of the cost savings sought by U.S. manufacturers.

Table 1: Employment in Maquiladoras Annual Average (1993-2006)

Year	Ensenada	Mexicali	Tecate	Tijuana	TOTAL
1993	3,396	20,528	5,807	77,943	107,694
	N/A	*N/A*	*N/A*	*N/A*	*N/A*
1994	4,231	21,570	7,921	85,521	119,243
	24.6%	*5.1%*	*36.4%*	*9.7%*	*10.7%*
1995	5,480	25,313	8,357	93,804	132,954
	29.5%	*17.4%*	*5.5%*	*9.7%*	*11.5%*
1996	6,485	32,863	8,364	111,807	159,519
	18.3%	*29.8%*	*0.1%*	*19.2%*	*20.0%*
1997	9,359	42,177	8,859	136,390	196,784
	44.3%	*28.3%*	*5.9%*	*22.0%*	*23.4%*
1998	10,672	47,170	10,057	146,202	214,101
	14.0%	*11.8%*	*13.5%*	*7.2%*	*8.8%*
1999	13,048	52,534	11,722	161,840	239,144
	22.3%	*11.4%*	*16.6%*	*10.7%*	*11.7%*
2000	15,067	60,063	12,112	187,339	274,581
	15.5%	*14.3%*	*3.3%*	*15.8%*	*14.8%*
2001	15,043	58,043	11,092	177,327	261,505
	-0.2%	***-3.4%***	***-8.4%***	***-5.3%***	***-4.8%***
2002	14,194	51,671	9,273	146,173	221,311
	-5.6%	***-11.0%***	***-16.4%***	***-17.6%***	***-15.4%***
2003	13,646	50,019	8,951	141,208	213,824
	-3.9%	***-3.2%***	***-3.5%***	***-3.4%***	***-3.4%***
2004	13,352	53,237	9,742	156,462	232,793
	-2.2%	*6.4%*	*8.8%*	*10.8%*	*8.9%*
2005	13,738	54,490	9,975	162,583	240,786
	2.9%	*2.4%*	*2.4%*	*3.9%*	*3.4%*
2006	13,412	54,235	10,742	170,535	248,924
	-2.4%	***-0.5%***	*7.7%*	*4.9%*	*3.4%*

Source: Statistics of the Maquiladora Industry of Exports, INEGI and Economic Indicators of the Mexican Bank
Note: No data is available after 2006

[5] San Diego Association of Governments, *Building a Foundation to Achieve Global Competitiveness: San Diego Regional Economic Prosperity Strategy*, Volume I, March 2008.

San Diego County, Imperial County and Baja California all have different levels of development, but they have closely interlinked economies resulting from their border proximity. Among the three regions, there are several policy synergies in economic development and planning, trade, transportation, and environmental issues, among the most important ones. For example, the development of productive clusters based on competitive advantages in each of these regions have fostered economic ties among the regions, particularly in issues related to personal and commercial transportation, key elements for the development of joint commercial initiatives.

2.2 Cross-Border Traffic

2.2.1 Passenger Crossings

Table 2, on the next page, reports the total number of inbound border crossings (and annual percent change) at all land ports of entry in California for the period extending from 1995 to 2009. Border crossings include:

- Passengers arriving by privately owned vehicles: number of persons arriving by private automobiles, pick-up trucks, motorcycles, recreational vehicles, taxis, ambulances, tractors, and other motorized private ground vehicles;

- Train Passengers: number of persons arriving by train and requiring U.S. Customs processing;

- Bus Passengers: number of persons arriving by bus and requiring U.S. Customs processing; and

- Pedestrians: number of persons arriving on foot or by certain conveyance (such as bicycles, mopeds, or wheelchairs) requiring U.S. Customs processing.

Note that the border crossing data represent the total number of passenger crossings that occur in a given year (i.e., each crossing is counted, including multiple crossings by the same person). Also, changes in port classification have occurred for San Ysidro and Otay Mesa due to changes in operations at these ports, and resulting reporting changes by U.S. Customs.[6] San Ysidro and Otay Mesa are two separate U.S. Customs ports, although they are physically quite close (six miles apart).

[6] Since 1997, passenger crossings (personal vehicles and their passengers, bus crossings and their passengers, and pedestrians) have been reported separately for Otay Mesa and San Ysidro.

Table 2: Incoming Passenger Crossings at California POEs (1995 – 2009)

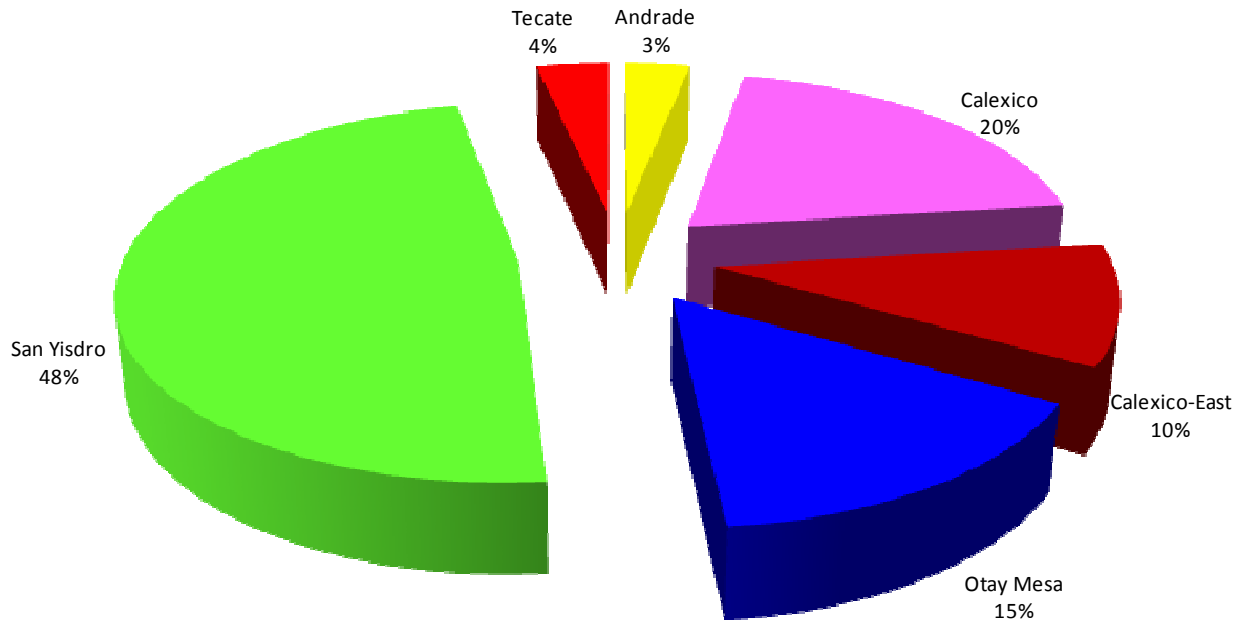
Year	IMPERIAL COUNTY				SAN DIEGO COUNTY				TOTAL
	Andrade	Calexico	Calexico East	County Total	Otay Mesa	San Ysidro	Tecate	County Total	
1995	2,754,439	27,851,316	0	30,605,755	11,921,191	0	3,650,209	15,571,400	46,177,155
	N/A	*N/A*	*0*	*N/A*	*N/A*	*0*	*N/A*	*N/A*	*N/A*
1996	2,986,551	25,700,238	0	28,686,789	9,093,754	0	3,239,822	12,333,576	41,020,365
	8.4%	***-7.7%***	*0*	*N/A*	***-23.7%***	*0*	***-11.2%***	*N/A*	***-11.1%***
1997	3,014,010	27,430,002	5,367,195	35,811,207	9,179,765	36,989,857	3,403,487	49,573,109	85,384,316
	0.9%	*6.7%*	*N/A*	*N/A*	*0.9%*	*N/A*	*0.5%*	*N/A*	*108.1%*
1998	3,188,412	29,262,831	5,369,930	37,821,173	10,373,371	39,644,307	3,226,908	53,244,586	91,065,759
	5.7%	*6.6%*	*0.1%*	*5.6%*	*13%*	*7.1%*	***-5.1%***	*7.4%*	*6.6%*
1999	3,461,041	28,500,828	6,587,602	38,549,471	10,852,444	42,005,306	3,302,561	56,160,311	94,709,782
	8.5%	***-2.6%***	*22.6%*	*1.9%*	*4.6%*	*5.9%*	*2.3%*	*5.5%*	*4.0%*
2000	3,574,533	28,466,151	7,610,037	39,650,721	12,154,029	39,351,555	3,680,416	55,186,000	94,836,721
	3.2%	***-0.1%***	*15.5%*	*2.9%*	*11.9%*	***-6.3%***	*11.4%*	***-1.7%***	*0.1%*
2001	3,194,688	22,155,003	7,430,288	32,779,979	9,865,998	45,336,547	2,530,194	57,732,739	90,512,718
	-10.6%	***-22.1%***	***-2.3%***	***-17.3%***	***-18.8%***	*15.2%*	***-31.2%***	*4.6%*	***-4.5%***
2002	3,250,865	19,050,007	6,900,066	29,200,938	11,339,951	45,274,997	2,806,133	59,421,081	88,622,019
	1.7%	***-14.1%***	***-7.1%***	***-10.9%***	*14.9%*	***-0.1%***	*10.9%*	*2.9%*	***-2.1%***
2003	3,227,053	16,387,808	6,162,918	25,777,779	12,790,033	48,727,602	3,232,509	64,750,144	90,527,923
	-0.7%	***-13.9%***	***-10.6%***	***-11.7%***	*12.7%*	*7.6%*	*15.1%*	*9.0%*	*2.1%*
2004	3,600,973	15,482,051	6,374,295	25,457,319	13,611,857	43,872,934	2,964,291	60,449,082	85,906,401
	11.5%	***-5.5%***	*3.4%*	***-1.2%***	*6.4%*	***-0.9%***	***-8.2%***	***-6.6%***	***-5.1%***
2005	3,331,017	16,357,673	6,499,227	26,187,917	14,143,415	41,417,164	2,534,347	58,094,926	84,282,843
	-7.5%	*5.6%*	*1.9%*	*2.9%*	3.9%	***-5.5%***	***-14.5%***	***-3.9%***	***-1.8%***
2006	3,076,963	15,740,529	7,802,684	26,620,176	12,541,581	40,740,621	2,386,375	55,668,577	82,288,753
	-7.6%	***-3.7%***	*20.0%*	*1.7%*	***-11.3%***	***-1.6%***	***-5.8%***	***-4.2%***	***-2.3%***
2007	2,699,079	16,265,738	7,041,162	26,005,979	10,364,123	37,022,194	2,383,017	49,769,334	75,775,313
	-12.2%	*3.3%*	***-9.7%***	***-2.3%***	***-17.3%***	***-9.1%***	***-0.1%***	***-10.6%***	***-7.9%***
2008	2,130,065	13,826,148	7,203,923	23,160,136	10,454,205	33,310,098	2,390,584	46,154,887	69,315,023
	-21.1%	***-14.9%***	*2.3%*	***-10.9%***	*0.8%*	***-10.1%***	*0.3%*	***-7.3%***	***-8.5%***
2009	1,477,659	7,496,583	3,455,231	12,429,473	5,803,425	17,440,152	1,295,524	24,539,101	36,968,574
	-0.4%	***-12.6%***	***-22.1%***	***-13.8%***	***-3.6%***	***-14.0%***	***-8.8%***	***-11.3%***	***-12.1%***

Source: U.S. Department of Transportation, Bureau of Transportation Statistics; based on data from U.S. Department of Homeland Security, Customs and Border Protection, OMR Database
Note: Estimates for 2009 are averages for the January – July period

Both San Diego County and Imperial County have recorded fewer border crossings in recent years, though this trend is somewhat more recent in San Diego County (since 2004). On top of increased security measures at the border, a number of other factors can be put forward, such as the lack of appropriate border infrastructure to cope with traffic, the economic recession (and associated reduction in employment opportunities in San Diego and Imperial Counties) and increased shopping options on the Mexican side.

The busiest POE remains San Ysidro, despite experiencing a 27 percent decrease in traffic since reaching a peak in 2001. As shown in Figure 5 below, San Ysidro accounted for 48 percent of all passenger crossings in 2008. About two thirds of passenger crossings in California occurred in San Diego County.

Figure 5: Distribution of Incoming Passenger Crossings by Port of Entry (2008)



Source: U.S. Department of Transportation, Bureau of Transportation Statistics; based on data from U.S. Department of Homeland Security, Customs and Border Protection, OMR Database.

2.2.2 Goods Movement by Truck

Trucks are the main mode of freight transport between the U.S. and Mexico, accounting for two-thirds of the goods traded in value.[7] In 2008, U.S. exports to Mexico totaled $212 billion and U.S. imports totaled $217 billion.

Table 3 shows the country or state of origin along with the country or state of destination of truck shipments (in thousands of dollars) for the five California POEs processing commercial vehicles.

Note that shipments moving through the U.S. which neither originate nor terminate in the U.S. are not reported in the table. These types of shipments are not considered to be part of the U.S. international merchandise trade, because they are neither a U.S. import nor a U.S. export.

In 2008, 81 percent of U.S. exports to Mexico by truck through the port of Otay Mesa had a destination in Baja California. Likewise, 86 percent of U.S. imports from Mexico by truck through Otay Mesa had a destination in California. In addition, this POE represented 67 percent of all U.S. exports through California and 75 percent of all U.S. imports through California from Mexico.

[7] In terms of weight, water is dominant because it moves heavy bulk products such as grains and crude oil.

Table 3: Origin and Destination of Truck Trade by POE, $ Thousand (2008)

Port of Entry	Exporter	Importer		Value	% of Total
Otay Mesa	U.S.	Mexico	All Mexico	$10,499,853	
			Baja California	$8,515,921	81%
			Other States	$1,983,933	19%
	California	Mexico	All Mexico	$9,734,732	
	Mexico	U.S.	All U.S.	$21,223,711	
			California	$18,264,974	86%
			Other States	$2,958,737	14%
Calexico-East	U.S.	Mexico	All Mexico	$4,515,504	
			Baja California	$4,012,186	89%
			Other States	$503,318	11%
	California	Mexico	All Mexico	$3,438,353	
	Mexico	U.S.	All U.S.	$6,324,392	
			California	$3,186,461	50%
			Other States	$3,137,931	50%
Tecate	U.S.	Mexico	All Mexico	$546,484	
			Baja California	$364,798	67%
			Other States	$181,686	33%
	California	Mexico	All Mexico	$513,586	
	Mexico	U.S.	All U.S.	$569,252	
			California	$372,534	65%
			Other States	$196,719	35%
Calexico	U.S.	Mexico	All Mexico	$30,911	
			Baja California	$12,539	41%
			Other States	$18,372	59%
	California	Mexico	All Mexico	$15,816	
	Mexico	U.S.	All U.S.	$0	
			California	$0	
			Other States	$0	
Andrade	U.S.	Mexico	All Mexico	$1,903	
			Baja California	$342	18%
			Other States	$1,561	82%
	California	Mexico	All Mexico	$416	
	Mexico	U.S.	All U.S.	$0	
			California	$0	
			Other States	$0	

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Data, based on data from the Census Foreign Trade Statistics Program.

A breakdown of California trade with Mexico (in value) in 2008, by commodity aggregate, is provided in Table 4 below. A detailed table (using the two-digit harmonized tariff schedule) is also provided in Appendix B. Imports from Mexico are twice as large as exports to Mexico (in value). Machinery and Transport Equipment is by far the largest trade sector between the U.S. and Mexico, accounting for 46.3 percent of exports and 66.3 percent of imports.

Table 4: California–Mexico Trade by Commodity in 2008 (in Millions of Dollars)

Commodity Description	Exports		Imports	
	$Million	% of Total	$Million	% of Total
Food, Beverages and Live Animals	$1,492.4	9.0%	$2,657.0	8.9%
Oil, Gas, Minerals and Ores	$167.7	1.0%	$7.3	0.0%
Chemicals and Related Products	$2,232.2	13.5%	$840.8	2.8%
Crude Materials and Related Products (Excluding Fuels)	$969.4	5.9%	$397.3	1.3%
Textile Products	$835.8	5.1%	$1,332.0	4.5%
Stone, Clay, Glass and Concrete Products	$217.5	1.3%	$268.9	0.9%
Metals and Articles of Base Metal (Excluding Precious Metals)	$1,724.7	10.4%	$1,065.6	3.6%
Machinery and Transport Equipment	$7,640.1	46.3%	$19,810.3	66.3%
Miscellaneous Manufactured Articles (Medical Instruments and Apparatus; Furniture; etc.)	$1,212.6	7.3%	$2,655.8	8.9%
Special Classification Provisions	$22.1	0.1%	$826.0	2.8%
TOTAL	**$16,514.4**	**100.0%**	**$29,861.1**	**100.0%**

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Data, based on data from the Census Foreign Trade Statistics Program.

2.2.3 Truck Crossings

Table 5 reports the total number of incoming truck crossings by POE for the period extending from 1995 to 2009.[8] Privately owned pick-up trucks are not considered. Please note that changes in port classification have occurred for San Ysidro and Otay Mesa, as well as for Calexico and Calexico East due to changes in operations at these ports, and resulting reporting changes by U.S. Customs.[9]

[8] U.S. Customs and Border Protection do not collect data on *outbound* border crossings.

[9] In the early 1990s, San Ysidro stopped processing trucks. Instead, trucks were diverted to Otay Mesa. U.S. Customs, however, did not immediately publish data differentiating truck crossings at Otay Mesa from San Ysidro. From 1994 to 1997, crossings at Otay Mesa and San Ysidro were reported as a combined total. Data elements have been reported separately since the beginning of 1997, but to have a consistent time series, the port is characterized as San Ysidro/Otay Mesa for freight crossings (i.e., trucks, truck containers loaded and unloaded, trains, rail containers loaded and unloaded, and train passengers). In the same way, since the opening of the Calexico East port of entry in December 1996 the Calexico West port of entry no longer processes commercial vehicles and trains.

Contrary to passenger traffic, truck traffic has been on the rise at most POEs. From 1995 to 2008, truck crossings grew by 4.5 percent per year on average. However, the most recent data available for 2009 (January through July) show that the recession is catching up with cross-border freight movements. Calexico East remains the second busiest POE (after Otay Mesa) for commercial traffic along the California-Baja California border.

Table 5: Incoming Truck Crossings at California POEs (1995 – 2009)

	IMPERIAL COUNTY				SAN DIEGO COUNTY			
Year	Andrade	Calexico	Calexico East	County Total	Otay Mesa/ San Ysidro	Tecate	County Total	TOTAL
1995	3,732	175,983	0	179,715	445,770	41,381	487151	666,866
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1996	3,983	170,526	0 N/A	174,509	530,704	49,423	580,127	754,636
	6.7%	-3.1%		N/A	19.1%	19.4%	19.1%	13.1%
1997	2,647	33,611	166,198	202,456	567,715	67,277	634,992	837,448
	-33.5%	-80.2%	N/A	N/A	6.9%	36.1%	9.5%	10.9%
1998	2,160	2	206,218	208,380	606,384	50,805	657,189	865,569
	-18.3%	-99.9%	24.1%	2.9%	6.8%	-24.4%	3.5%	3.3%
1999	1,959	0	261,545	263,504	646,587	59,606	706,193	969,697
	-9.9%	-100%	26.8%	26.5%	6.6%	17.3%	7.5%	12.1%
2000	1,517	0	278,811	280,328	688,340	62,878	751,218	1,031,546
	-22.5%		6.6%	6.4%	6.4%	5.4%	6.4%	6.3%
2001	1,767	0	256,715	258,482	708,446	60,887	769,333	1,027,815
	16.4%		-7.9%	-7.8%	2.9%	-3.1%	2.4%	-0.3%
2002	2,075	0	276,390	278,465	731,291	57,655	788,946	1,067,411
	17.4%		7.6%	7.7%	3.2%	-5.3%	2.6%	3.8%
2003	2,253	0	261,140	263,393	697,152	59,363	756,515	1,019,908
	8.5%		-5.5%	-5.4%	-4.6%	2.9%	-4.1%	-4.4%
2004	2,697	0	312,227	314,924	726,164	69,670	795,834	1,110,758
	19.7%		19.5%	19.6%	4.1%	17.3%	5.2%	8.9%
2005	2,733	0	320,212	322,945	730,253	69,586	799,839	1,122,784
	1.3%		2.5%	2.6%	0.5%	-0.1%	0.5%	1.1%
2006	1,279	0	307,291	308,570	749,472	73,441	822,913	1,131,483
	-53.2%		-4.1%	-4.5%	2.6%	5.5%	2.9%	0.7%
2007	478	0	323,348	323,826	738,765	77,320	816,085	1,139,911
	-62.6%		5.2%	4.9%	-1.4%	5.2%	-0.8%	0.7%
2008	412	0	325,975	326,387	776,972	75,595	852,567	1,178,954
	-13.8%		0.8%	0.8%	5.1%	-2.2%	4.5%	3.4%
2009	237	0	160,022	160,259	386,132	38,042	424,174	584,433
	-3.3%		-20.2%	-20.2%	-16.2%	-12.8%	-15.9%	-16.1%

Source: U.S. Department of Transportation, Bureau of Transportation Statistics; based on data from U.S. Department of Homeland Security, Customs and Border Protection, OMR Database.

Notes: [1] *Data include both loaded and unloaded trucks.*
[2] *Data are not available in May 2003 for Andrade and in July 2003 for Calexico West and Calexico East.*
[3] *U.S.-VISIT was implemented for all three ports of entry in December 2004.*

2.2.4 Border Wait Times

In 2007, HDR conducted a survey of border wait times for commercial trucks at Otay Mesa. Trucks were broken down into three types: FAST, Loaded Non-FAST, and non-load carrying ("Empty"). After evaluating recent collection methods used in time-delay studies, the method was chosen to record individual truck license plates. To ensure that a sufficient number of trucks were sampled without loss of data and to increase accuracy of the actual data recorded, high-resolution cameras with synchronized photographic time stamps was employed.

The metric for total wait time was developed to account for border crossing system-wide wait time. Total wait time was defined as the number of minutes elapsed from entering the line leading to the Mexican export inspection (if a queue existed) through exit from U.S. inspection facilities (including any state-operated inspections within the compound). Importantly, this definition of border crossing wait time represents an expansion of traditional wait time metrics because it includes wait time prior to arrival and wait time after U.S. primary through final exit.

Trucks were captured at three stages in the border crossing process:

1. Entering the Line ("line") – The beginning of the queue leading to Mexican inspection facilities, "floating" to the end of the line when the trucks began to queue.

2. Arriving at Mexican Inspection Facilities ("arrival") – The entry point into the official Mexican inspection facilities (export processing) and the starting point of the wait when there was no queue. Once a truck is processed for Mexican export at the arrival position, the truck is queued for U.S. primary inspection.

3. Exiting U.S. Inspection Facilities ("exit") – The point of exit from U.S. facilities after the final inspection on by U.S. federal, state, or local agencies.

To account for possible seasonal fluctuations in truck wait times, the sample average wait times needed to be converted to annual values. Sample average wait time data were annualized as follows. First, monthly data was obtained. This was needed to test for seasonality in the data and to extrapolate wait times collected in November, December, and February to yearly values. CBP average wait times by month for commercial vehicles in 2006 were used.[10] Second, the monthly data was analyzed to detect seasonality or fluctuations in values over the course of the year. Third, given the value of other months compared to November, December, or February, an index was constructed with 100 being the average monthly wait time across the calendar year. Months with average wait times higher than the average had values over 100 and months with lower wait times than the average had values under 100. Fourth, the index was used to get extrapolated average wait time per month across an entire year.

[10] Monthly data on average wait times were available only for 2006 at the time of our 2007 study.

Table 6 below shows risk-adjusted wait time estimates at Otay Mesa in 2007 for loaded, empty and FAST trucks in peak and off-peak conditions. Estimates are presented at the mean, the 10th percentile and the 90th percentile. The average wait time for all trucks is estimated at 121 minutes. As expected, the wait time for loaded trucks at peak times, is greater than the overall average wait – loaded Non-FAST trucks are likely to be more closely inspected than FAST or empty trucks.

Table 6: Border Wait Times for Commercial Trucks at Otay Mesa on Weekdays (2007)

	Average	Lower Bound (10%)	Upper Bound (90%)
Peak, FAST - Line to Arrival Times	1.09	0.55	1.98
Peak, FAST - Arrival to Exit Times	89.89	59.01	140.60
Additive Total	90.98	59.56	142.58
Non-Peak, FAST - Line to Arrival Times	0.32	0.00	1.51
Non-Peak, FAST - Arrival to Exit Times	106.36	60.42	123.58
Additive Total	106.68	60.42	125.09
Peak, Empty - Line to Arrival Times	1.71	0.24	8.16
Peak, Empty - Arrival to Exit Times	120.46	76.16	164.05
Additive Total	122.17	76.4	172.2
Non-Peak, Empty - Line to Arrival Times	7.23	0	14.56
Non-Peak, Empty - Arrival to Exit Times	100.31	59.36	210.11
Additive Total	107.54	59.36	224.67
Peak, Loaded - Line to Arrival Times	1.25	0.69	1.81
Peak, Loaded - Arrival to Exit Times	136.57	116.43	159.54
Additive Total	137.82	117.12	161.35
Non-Peak, Loaded - Line to Arrival Times	0.49	0.16	2.32
Non-Peak, Loaded - Arrival to Exit Times	124.93	120.64	136.65
Additive Total	125.42	120.81	138.97
All Trucks - Line to Arrival Times	1.58	0.40	4.05
All Trucks - Arrival to Exit Times	120.02	91.98	155.53
Additive Total	121.60	92.38	159.58

Source: HDR Decision Economics, 2007

3. METHODOLOGY

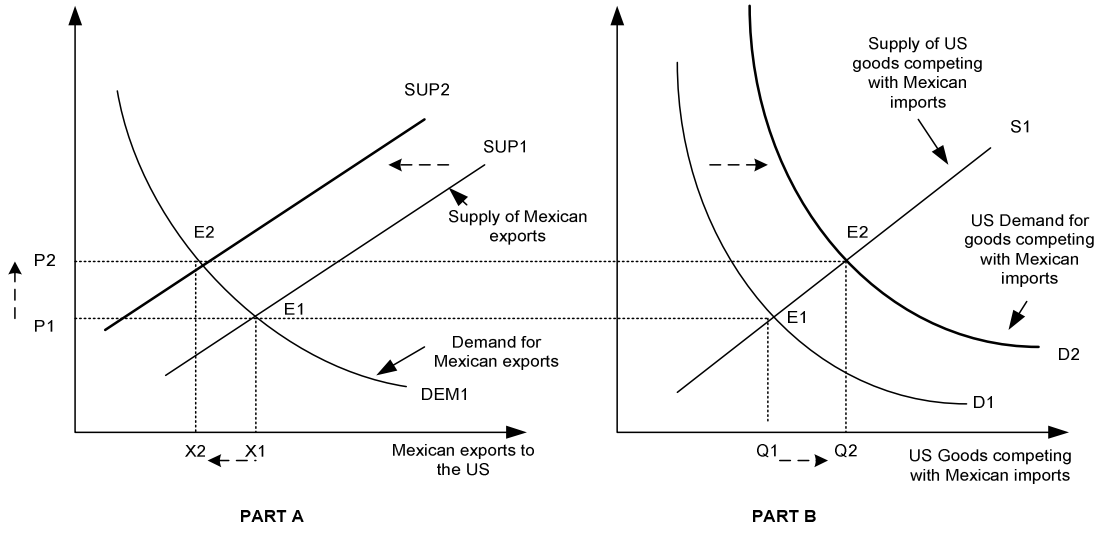
This chapter presents the methodological framework used to estimate the economic impacts of border delays for two distinct categories of cross-border traffic: personal crossings (Section 3.2) and freight movements (Section 3.3). Section 3.1 introduces some fundamental concepts of the economics of international trade. Input-output models and multipliers are discussed at the end of the chapter, in Section 3.4.

3.1 Conceptual Framework

This section uses the fundamental concepts of the theory of trade between two countries to investigate the losses due to border delays incurred by the economies of the trading countries. The illustration below is only one of the scenarios that can be assessed.

Figure 6 shows the effects of congestion and border delays on industries located on both sides of the border. The figure is divided into two parts. Part A shows the effect on the exporter, and Part B shows the corresponding effect on consumers and producers of competing products in the export market. To facilitate the analysis, it is assumed in the figure that the exporter firm is a Mexican company and the export market is the United States.

Figure 6: Effects of Congestion and Border Delays on the Demand for Final Goods



The initial market equilibrium in Figure 6 is *E1*. The quantity of Mexican exports is *X1*, the quantity of domestic output is *Q1* and the prevailing market price is *P1*.

An increase in congestion and border delays causes the supply curve of Mexican exports to shift to the left (from *SUP1* to *SUP2*) as exporters are faced with higher transportation costs. The volume of Mexican exports falls to *X2* and the price increases to *P2*. Mexican exporters are worse off in terms of volume of shipments. Their revenues will also fall if the increase in price does not compensate for the reduction in volume, i.e. if the percentage increase in price is smaller than the percentage reduction in shipments.

The increase in price of Mexican exports makes U.S. goods competing with Mexican exports more competitive, and the demand for U.S. domestic products increases. This is illustrated by a shift to the right of the demand curve for U.S. goods competing with Mexican exports (from *D1* to *D2*). As a result, the output of U.S. goods competing with Mexican goods increases but so does their price. U.S. producers clearly benefit from the reduction in the volume of Mexican exports (increase in the producer surplus). However, U.S. consumers are hurt by higher market prices (decrease in the consumer surplus) and possibly reduced choice.

The reduction in the volume of Mexican exports (and the increase in the price) will depend on the shape of the demand and supply curves, which are in turn determined by the following factors:

- Price elasticity of demand[11] for Mexican exports;
- Price elasticity of supply of Mexican exports, and
- Elasticity of Mexican export shipments with respect to border delays.

The increase in the volume of the U.S. domestic production will depend on the following factors:

- Price elasticity of demand for U.S. goods competing with Mexican exports;
- Price elasticity of supply of U.S. goods competing with Mexican exports.

This example illustrates, in a simplified way, the effects of congestion and border delays (and the mechanisms by which these effects are initiated) on *both* sides of the cross-border economy, in terms of output and (implicitly) in terms of employment, earnings, and tax revenues. A number of other considerations and challenges should also be taken into account.

Though this example only shows Mexican exports to the United States, the impact on trade can also be estimated in a similar fashion from the reverse perspective (U.S. exports to Mexico).

[11] The price elasticity of demand measures the responsiveness of quantity demanded to a change in price, with all other factors held constant. For instance, a price elasticity of demand of – 0.5 means that a 1 percent *increase* in price will lead to a 0.5% *decrease* in quantity demanded.

The magnitude of the impact will depend on the group of commodities under consideration. In some cases, a one-hour delay at the border means that the shipment will not be delivered until the next day. This may have major consequences to industries that are time sensitive. Examples of highly time sensitive industries include those industries in which just-in-time inventory management is widespread (e.g., automotive industry),[12] or in which perishability is a key factor (e.g., agricultural products).

Note, also, that this example shows the effect of border delays on trade in the *short* run solely. Continued congestion and delays at the border will most certainly have a long run impact too. In particular, delays at the U.S.-Mexico border may hinder the border region's ability to attract new investment, as well as maintain its existing investments. Since the uncertainty over wait times acts as a tariff-like barrier to the import and export of goods, it may reduce the incentive for U.S.-based companies to locate on the Mexican side for instance (i.e., desourcing of *maquiladoras*). Therefore, in the long run congestion and border delays could produce a major disincentive for investment in the California – Baja California border region.

A corollary of desourcing is the potential diversion of commercial traffic to other POEs (less ridden with border congestion and unexpected delays). A 2006-2007 survey of northbound border crossers in Imperial County revealed that more than 70 percent of interviewees would be willing to pay $3 per crossing to use an express lane that would provide a faster way to cross the border.[13] And about 25 percent of interviewees said they would use it at least five times per month.

Last but not least, congestion and border delays have an impact not only on the total output or amount of goods traded, but also on the productivity of firms, especially in the manufacturing sector. Loss of productivity can result from disruptions in the cross-border supply-chain (or higher inventory levels as a way to respond to such disruptions), and from reductions in Mexican sourcing.

The fundamental concepts and mechanisms of the theory of trade described above are used to assess the economic impacts of border delays on freight movements (at the producer level), as well as on personal trips (at the consumer level).

3.2 Methodology for Personal Trips

The following is a description of the methodology to estimate the economic impacts of (i) foregone recreation, shopping, and vacation trips, (ii) foregone work trips, and (iii) productivity losses from impaired cross-border movements.

3.2.1 Lost Cross-Border Recreation, Shopping and Vacation Trips

Traveler's behavior differs based on trip purpose, trip time, and trip destination. Under each trip category, it is important to assess the traveler's sensitivity to delay. Shopping and leisure trips

[12] This topic is discussed in greater detail in David J. Andrea, and Brett C. Smith, *The Canada-U.S. Border: An Automotive Case Study*. Prepared for the Canadian Department of Foreign Affairs and International Trade by the Center for Automotive Research, January 2002.

[13] Crossborder Group Inc. and HDR Decision Economics, *Imperial Valley-Mexicali Economic Delay Study: Initial At-Border Survey Results*, presentation to SANDAG and Caltrans, March 2007.

tend to be easier to forego because of excessive delays than work trips. For instance, a worker will be more willing to wait for two hours at the border to commute to his/her job. However, a U.S. tourist will be less willing to cross the border if he/she knows it may take him/her two hours of delay to get back to the United States.

The methodology therefore takes into account the breakdown of trips by purpose, time, and destination together with the sensitivity of each type of trip to the delay at the border. These two components are essential to estimate the number of trips foregone. Given the characteristics of these trips in terms of destination, length and average spending, the methodology derives the direct economic impact. Subsequently, the indirect and induced effects are estimated using regional economic multipliers. The economic impacts are estimated for San Diego County, Imperial County and Northern Baja California, as well as for the State of California and Mexico.

Estimating the economic impact of lost recreation, shopping and vacation trips consists of seven steps:

Step 1. Obtain current data and projections on passenger crossings by port of entry, trip purpose (shopping, recreation and vacation) and destination (U.S. and Mexico) from the U.S. Bureau of Transportation Statistics;

Step 2. Estimate the annual percentage change in travel time associated with increased wait times and congestion;

Step 3. Apply demand elasticity coefficients to the estimated changes in travel time and derive the potential annual reduction in crossings for recreation, shopping and vacation trips, due to increased wait times and congestion;

Step 4. Estimate the expected revenue loss (spending from vacationers, shoppers and other travelers) associated with the foregone trips based on the reduction in spending per trip;

Step 5. Adjust for changes in local demand (e.g., vacation money spent in Mexico instead of the U.S., and vice versa);[14]

Step 6. Derive the direct impact of foregone spending on regional and state/national output, income (earnings) and employment;

Step 7. Estimate the direct, indirect and induced impacts (on output, earnings and employment) of foregone trips on both sides of the border using coefficients and relationships from the input-output model.

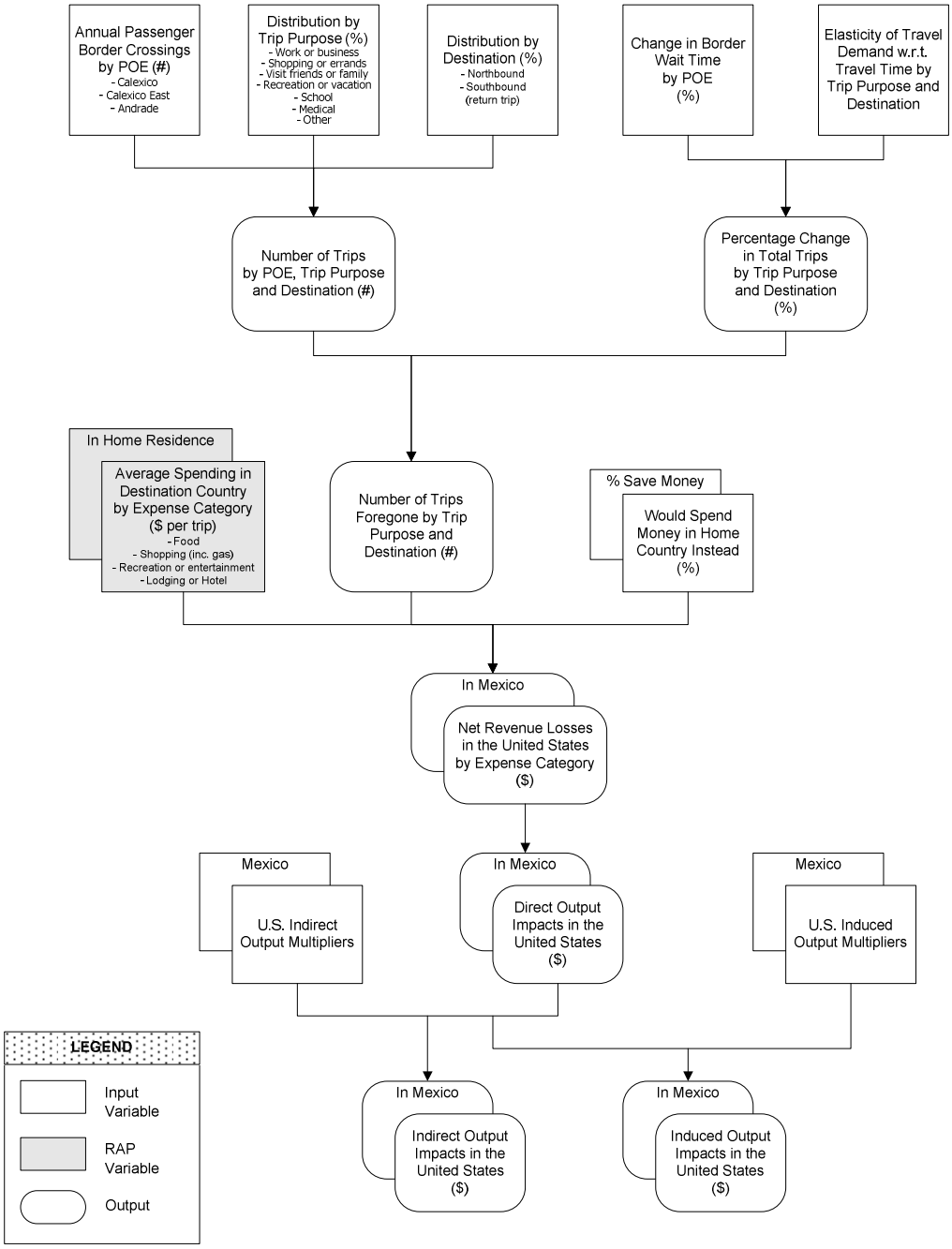
[14] The adjustments are made using survey data on the sensitivity of shoppers to delay at border and the alternative shopping destination and spending if they forego their trips to the U.S..

Two surveys of cross-border travelers were conducted on behalf of HDR at land POEs located along the California – Baja California border in 2004-2005 and 2006–2007 respectively. The survey responses provided key inputs to the economic impact model, such as trip origin and destination, trip purpose, expected wait time at the border, sensitivity to increased wait times, average spending per trip, and alternative local spending if cross-border trip were not made.

Figure 7 on the next page provides an overview of the estimation process. The figure indicates that the number of lost trips due to border delays can be estimated once the data on trip volume by purpose is collected and the sensitivity of shoppers and tourists to wait time is known (from survey and existing volume database on border crossings). These estimated lost trips together with the average spending form the initial impact of lost revenues to the local economy. Using multipliers from an input-output model, we can then derive the direct, indirect, and induced effects.

The estimation of the economic impacts is conducted within a risk analysis framework to account for uncertainty surrounding some input variables. These risk analysis process (RAP) variables are shaded grey in the structure and logic diagram.

Figure 7: Structure and Logic Diagram for Estimating the Economic Impacts of Lost Cross-Border Recreation, Shopping and Vacation Trips



3.2.2 Lost Cross-Border Work Trips

Similarly, estimating the economic impact of lost cross-border work trips is done in seven main steps:

Step 1. Obtain current data and projections on the number of passenger crossings, broken down by port of entry, trip purpose (work) and destination (U.S. and Mexico);

Step 2. Estimate the annual percentage change in travel time associated with increased wait times and congestion;

Step 3. Apply demand elasticity coefficients to the estimated changes in travel time and derive the number of work trips foregone annually, due to increased wait times and congestion;

Step 4. Estimate the expected revenue (productivity) loss associated with the foregone work trips using average wage estimates;

Step 5. Adjust for changes in local demand (e.g., local jobs gains);

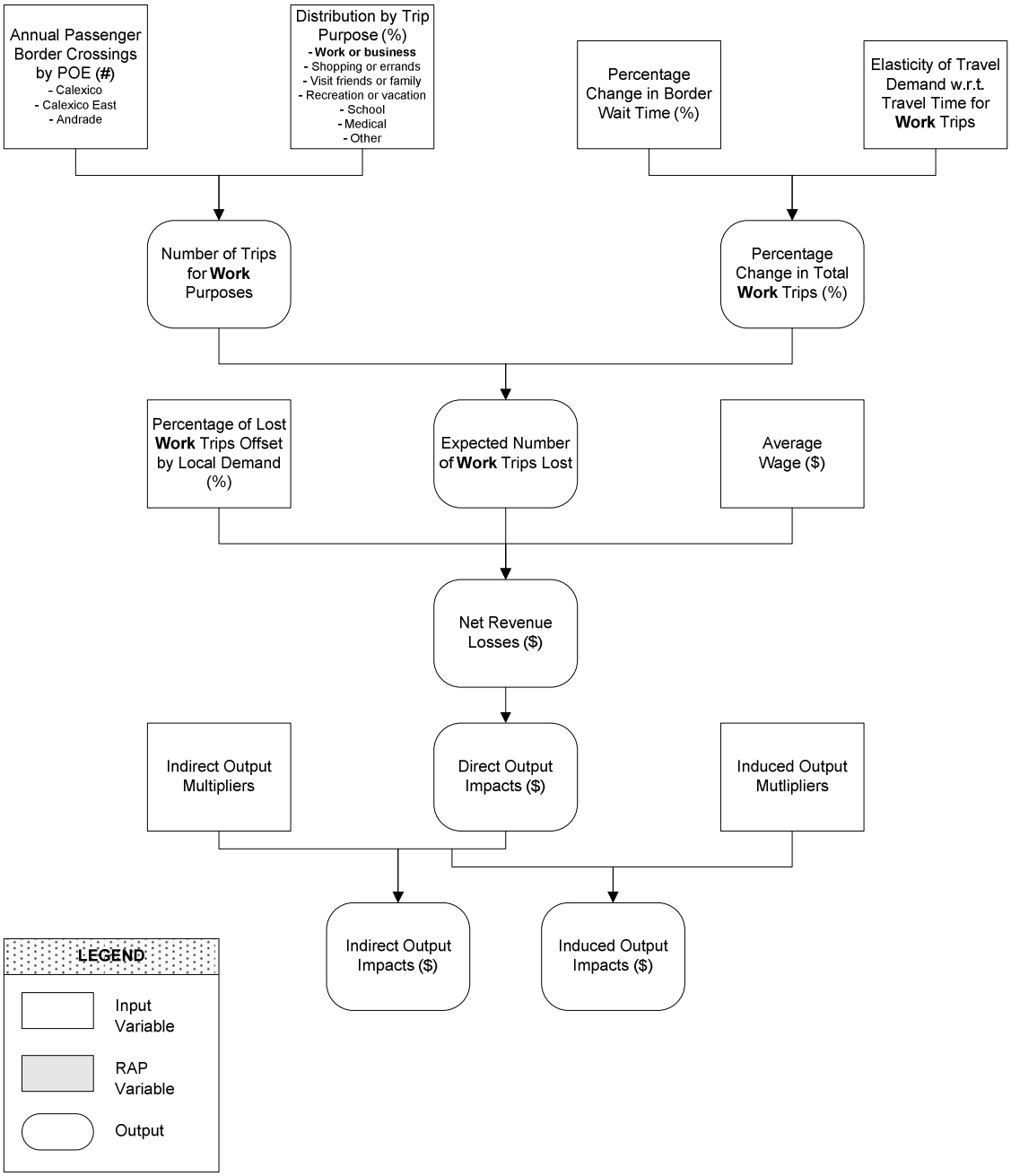
Step 6. Derive the direct impact of foregone work trips on regional and state/national output, income (earnings) and employment;

Step 7. Use indirect and induced multipliers to obtain the indirect, induced and total impacts (on output, earnings and employment) of foregone work trips.

Responses to the 2004-2005 and 2006–2007 surveys are also used for estimating the economic impacts of forgone work trips.

Figure 8 on the next page provides an overview of the estimation process. The figure depicts a method similar to the one used for recreation, shopping and vacation trips. The number of lost work trips due to border delays is estimated based on the number of crossings for work purposes and the sensitivity of workers to wait times. Lost work trips are then translated into lost earnings. Using multipliers from an input-output model, we can then derive the direct, indirect, and induced effects.

Figure 8: Structure and Logic Diagram for Estimating the Economic Impacts of Lost Cross-Border Work Trips

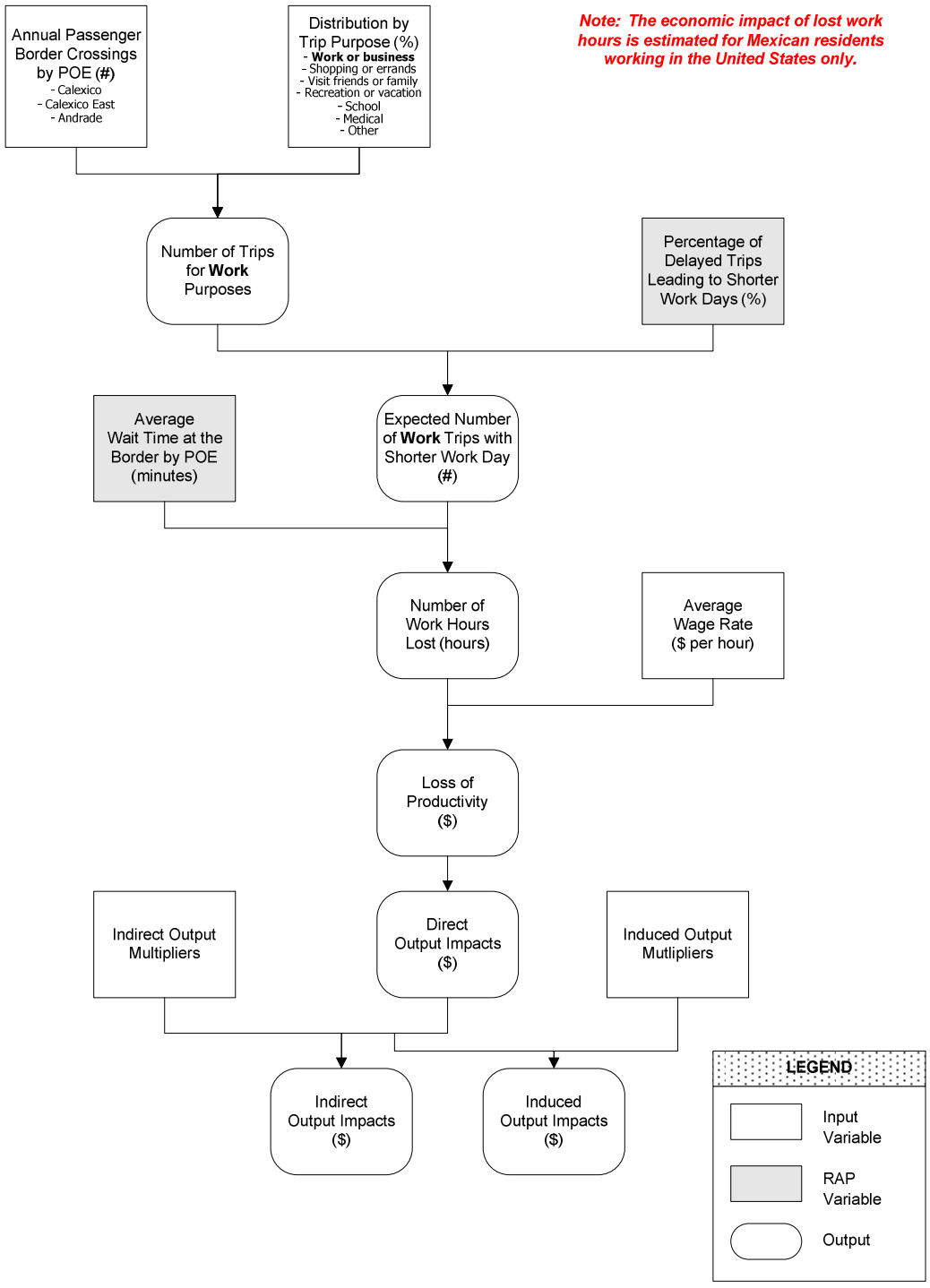


3.2.3 Productivity Losses due to Impaired Cross-Border Movements

In addition to lost work trips, border delays have a significant impact on the regional productivity. These delays cause workers to be late at work, spend less time with their family, and make trips in less desirable time. While some of this effect is not directly related to the macro-economic impact, reduced working time has a direct effect on productivity and therefore should be included in the economic impact assessment. If, as a result of a border delay, a person

works six hours instead of eight hours, the two hours lost should be included in the economic impact calculation. On the other hand, if that person is delayed at the border but still manages to work eight hours, the delay is part of the user cost and is not estimated at the macro-economic level. Figure 9, below, provides an overview of the estimation process.

Figure 9: Structure and Logic Diagram for Estimating the Economic Impacts of Productivity Losses due to Impaired Cross-Border Movements



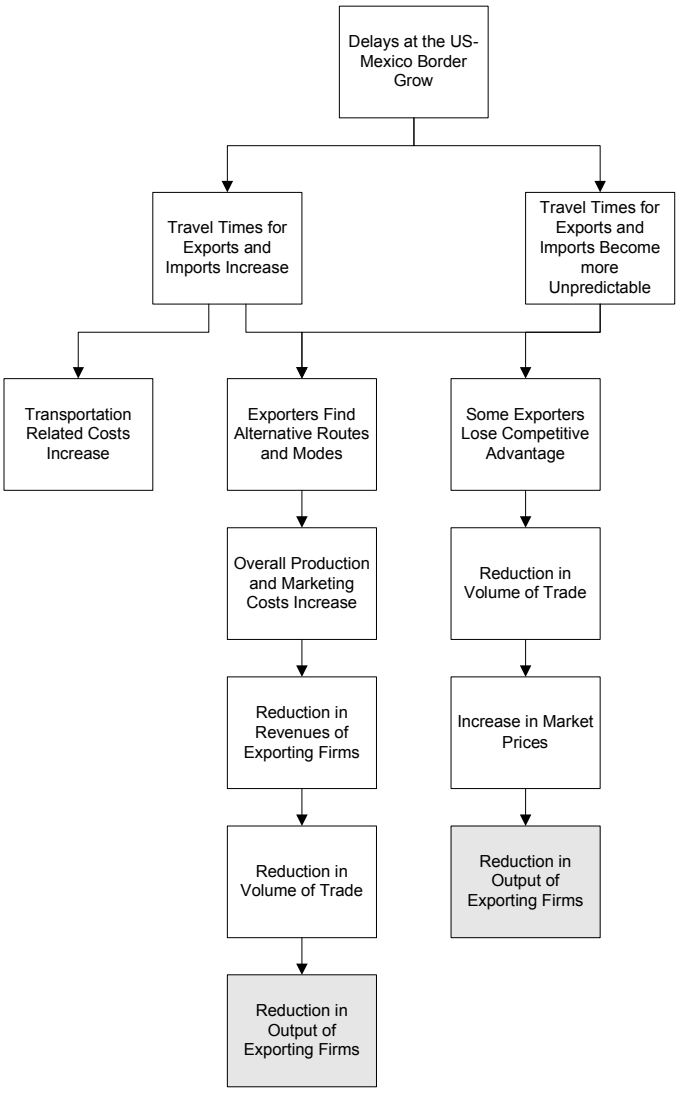
3.3 Methodology for Freight Flows

Based on the conceptual framework laid out in Section 3.1, an economic impact methodology was developed to estimate the economic impacts of border delays on freight activity.

3.3.1 Effects of Border Delays on Prices and Production

Figure 10 below depicts the structure and logic diagram for production and management decisions in situation of increasing delays at the U.S.-Mexico border, and identifies the key effects of border delays.

Figure 10: Effects of Border Delays on the Production Process of Firms Engaged in Cross-Border Activity



As shown in the figure, the effects of increasing wait times are estimated separately from the effects of wait time uncertainty. However, in both cases, the final result is an estimation of the change in output of exporting firms. Multipliers from input-output models are subsequently used to derive the direct, indirect and induced effects of border delays (see Section 3.4).

3.3.2 Estimation of Output Impact

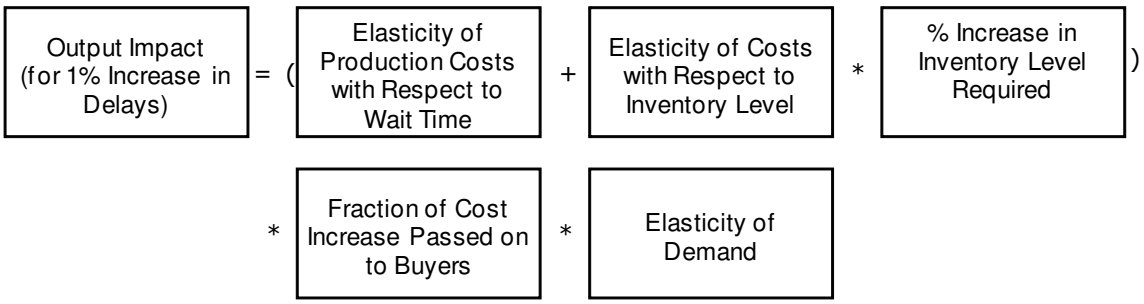
Various elasticities, derived from the literature,[15] are used to estimate the economic impacts on just-in-time industries (e.g., Machinery and Equipment, and Manufactured Goods) and the economic impacts on other industries that trade primarily finished goods (e.g., Agricultural and Food Products, Mining and Mineral Products) separately.

The following data is used to estimate the impact of border delays on the output of just-in-time industries:

- Elasticity of production costs with respect to wait time;
- Elasticity of manufacturing costs with respect to inventory level;
- Percentage increase in inventory level required, for each one percent increase in border delays, to protect the production line against delays;
- Fraction of cost increase passed on to buyers; and
- Elasticity of demand for final product.

The percentage change in total output is calculated as shown in Figure 11 below.

Figure 11: Calculation of Output Impact in Just-in-Time Industries



For other industries, border delays have an output reduction impact through two related effects:

1. Reduction in output due to a loss of competitive advantage in export markets related to transportation times; and
2. Reduction in output due to higher transportation costs.

[15] See in particular Blanchard, G., *Highways and Logistics and Production Performance*, Transport Canada/ Economic Analysis Special Infrastructure Project, Report TP 12791E, June 1996.

As described in Section 3.1, there is an offsetting effect to the reduction in output mentioned above. The offsetting effect is an increase in output of local or domestic producers competing with imports: since imported goods become more expensive and less attractive, local producers experience a stronger demand.

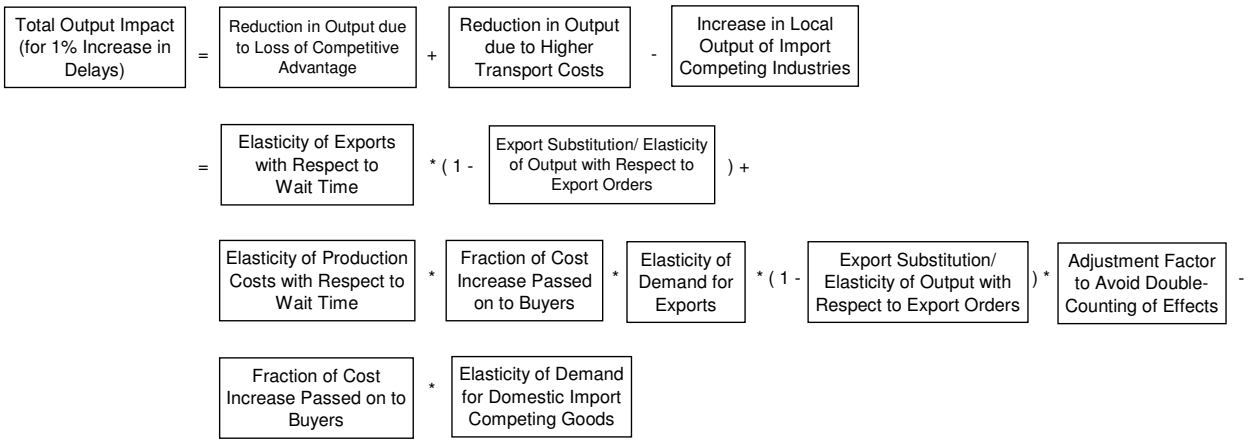
It should also be pointed out that the reduction in export demand is partially offset by domestic sales, or export substitution. In other words, it is assumed in the methodology that exporters are able to sell some of the lost exports on the domestic market.

The following data is used to estimate the impact of border delays on the output of other industries:

- Elasticity of exports with respect to border wait times;
- Export substitution with domestic sales;
- Elasticity of production costs with respect to border wait times;
- Fraction of cost increase passed on to buyers;
- Elasticity of demand for exports;
- Adjustment factor to avoid double-counting of effects (percentage of export volume that is affected by a loss in competitive advantage and higher transportation costs caused by delays); and
- Elasticity of demand for domestic import competing goods.

Ideally, those estimates are provided by industry or main commodity grouping, to account for the fact that not all firms are equally vulnerable to border delays. The (percentage) reduction in output of exporting firms is calculated as shown in Figure 12 below.

Figure 12: Calculation of Output Impact in Other Industries



Once the percentage change in output is known for each type of industries, it is multiplied by the projected freight value for each port of entry to obtain the total output impact. For this update, the forecasting period extends from 2009 to 2017. Note that the estimated total impacts are annual, and *not* cumulative.

3.3.3 Key Input Variables

The calculation of the output impact is done by means of a spreadsheet model using a number of input variables and the relationships described above.

The key input variables of the model are as follows:

- **Traffic Volumes –** Annual truck traffic volumes at Otay Mesa, Tecate, Calexico East and Andrade are obtained from the Bureau of Transportation Statistics (Transborder Surface Freight Data); the average annual growth rate for truck traffic over the forecasting period is derived from U.S.-Mexico trade forecasts.

- **Processing Times –** Processing times (with and without secondary inspection) at the border are derived from measurements reported by the Federal Highway Administration and other agencies for each POE, as well as interviews with cross-border trucking companies and Customs brokers.

- **Average Freight Value –** The average freight value per truck is obtained by dividing the total freight value by the number of trucks in both directions at each POE. It is used to estimate the total value of freight at risk.

- **Average Length of Haul –** The average length of haul (in miles) is used in conjunction with the average truck speed to determine travel time.

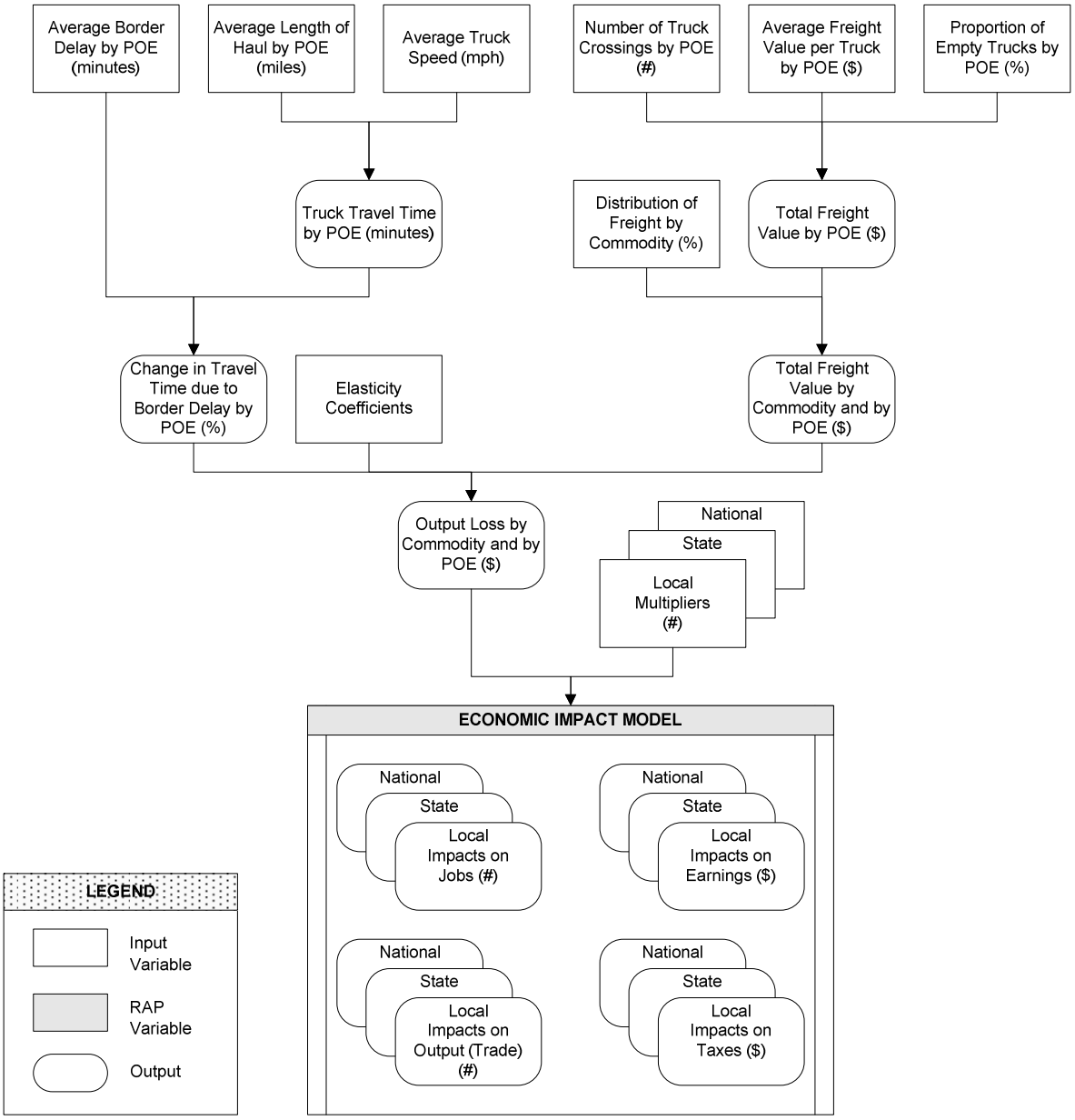
- **Average Speed –** The average truck speed (in miles per hour) for the entire trip is used in conjunction with the average length of haul to determine travel time. It does not reflect the wait at the border, and is assumed to be the same in both directions.

- **Trucks Origin and Destination –** Percentage of trucks bound to/from San Diego County, Imperial County, California and Baja California.

The estimation of the economic impact is conducted within a risk analysis framework to account for uncertainty surrounding the input variables: model inputs are provided as a range of estimates (with lower and upper bounds) instead of single point estimates.

Figure 13 below summarizes the methodological framework along with the input variables (described above) to assess freight impacts. Note again that the impacts are separately estimated on both sides of the border.

Figure 13: Structure and Logic Diagram for Estimating Freight Impacts



3.4 Economic Impacts and Input-Output Models

Economic impact analysis helps quantify the effects of a change in the demand for goods and services on the economy of a region. Effects are typically measured in terms of business output (sales), employment (jobs), labor income (earnings), and tax revenue. The initial change in demand can be the result of decisions made by the government, firms, or households.

The reduction in trade due to border delays affects the export manufacturing industries, and hence reduces the need for inputs (purchases) of labor, materials, equipment, and services, which are supplied by local (and non-local) producers. To the extent that the reduction in these purchases result in reduced productivity and/or reduced levels of labor force utilization (employment), it will cause a decline in the local economy with attendant costs of lower employment, personal income, business profits, and tax revenue.

Typically, economic impact analysis involves the estimation of three types of effects, commonly referred to as "direct effects", "indirect effects", and "induced effects".

3.4.1 Direct Effects

In cross-border trade, direct effects are the direct consequence of changes in spending in agricultural, industrial, commercial, warehousing and office development by local import/export companies. Direct spending results in the employment of workers, sales of locally produced goods and services, and generation of local tax revenue. For instance, the direct effect of foregone shopping trips (due to border delays) is the incremental revenue loss to the cross-border retail industry. Assessing the direct effects of border delays on the economy is indeed a key objective of this study.

3.4.2 Indirect Effects

Indirect effects are the result of purchases by local firms who are the direct suppliers to the import/export companies. The spending by these supplier firms for labor, goods and services necessary for the production of their own goods or services creates output from other firms further down the production chain, thus bringing about additional employment, income and tax activity. Output, employment, income, and tax revenue resulting from spending by supplier firms (but not households) are considered to be indirect effects.

3.4.3 Induced Effects

Induced impacts are the changes in regional business output, employment, income, and tax revenue resulting from personal (household) spending for goods and services – including employees of import/export companies**,** employees of direct supplier firms (direct effect), and employees of all other firms comprising the indirect effects. As with business purchasing, personal consumption creates additional economic output, leading to still more employment, income, and tax revenue. Of the three types of effects, induced effects are typically the largest.

Total economic impact is the sum of the direct, indirect and induced effects of the project or policy change being evaluated. It measures the total change in economic output, employment, income, and local tax revenue generated by successive rounds of spending by businesses and households.

3.4.4 Economic Multipliers

The indirect and induced business impacts of a project or policy change are often referred to as "multiplier effects", since they can make the overall economic impacts substantially larger than the direct effects alone.[16] In reality, while indirect and induced impacts do always occur, the net impact on the total level of economic activity in an area may or may not be increased by multiplier effects. That outcome depends on the definition of the study area and the ability of the area to provide additional workers and capital resources, or attract them from elsewhere.

Multipliers can be expressed in terms of output or jobs. An output multiplier is the total overall increase in dollars of business output (sales) for all industries, per dollar of additional final demand (purchases) of a given industry in that area. A job multiplier is the total overall increase in jobs for all industries, per new job created in a given industry.

3.4.5 Input-Output Models

Input-output (IO) models[17] are used to estimate the direct, indirect and induced effects of border delays on both personal crossings and freight movements. IO models are often used to simulate the impact of a demand shock on the economy. Shock here refers to any departure from the status quo, in this case any change in the demand for goods and services.

In this study we use the IMPLAN® Professional 2.0 software, which is an input-output based economic impact assessment model originally developed by the U.S. Forest Service – and now maintained by the Minnesota IMPLAN Group, Inc. The model data files include transaction information (intra-regional and import/export) for 440 industrial sectors (corresponding to four and five digit North American Industry Classification System (NAICS) codes), and data on 21 economic variables, including employment, output, and employee compensation. The model is populated with the most recent (2007) data available for San Diego County, Imperial County, and the State of California.

In the course of the analysis, several adjustments are made to help ensure that all impact estimates are truly incremental and specific to the study area:

- Since the original IMPLAN data is for 2007, it is adjusted for inflation to express the results in current dollars;[18]

[16] The term "multiplier effect" describes the phenomenon whereby the change in total economic activity resulting from a change in direct spending is greater than the direct spending alone – that is, it is a measure of all indirect and induced effects. The ratio of total effect (e.g., total business output) to the direct effect is termed an "impact multiplier," and is the most direct measure of a regional economy's ability to meet new demand with local (as opposed to imported) resources. The higher the multiplier the greater is the total economic response to the initial direct effect. Multipliers can also be expressed in terms of employment and labor income.

[17] An input-output approach was followed in this study, drawing on an extensive body of research and experience with successful applications to transportation project analysis. An IO model calculates impact multipliers, which are then used to compute direct, indirect, and induced effects – output, employment, income, and local tax revenue generated per dollar of direct spending for labor, goods, and services.

[18] Deflators derived from the most current Bureau of Labor Statistics (BLS) Growth Model are used to convert the cash flows to current dollars. These deflators are applied at the commodity level and vary for different goods and services.

- Social Accounting Matrix (SAM)[19] multipliers used for estimating indirect and induced effects are modified with Regional Purchase Coefficients (RPC)[20] to ensure that imports to the study area are not accounted for; and

- Households are the only institutions considered when building type SAM multipliers. As a result, induced effects are based on the income of residents of the study area solely.

To estimate the economic impact on the Mexican side we use an input-output matrix for the State of Baja California developed by the Autonomous University of Baja California (UABC) and the Ministry of Economic Development of Baja California State (SEDECO) with 2000 data.[21]

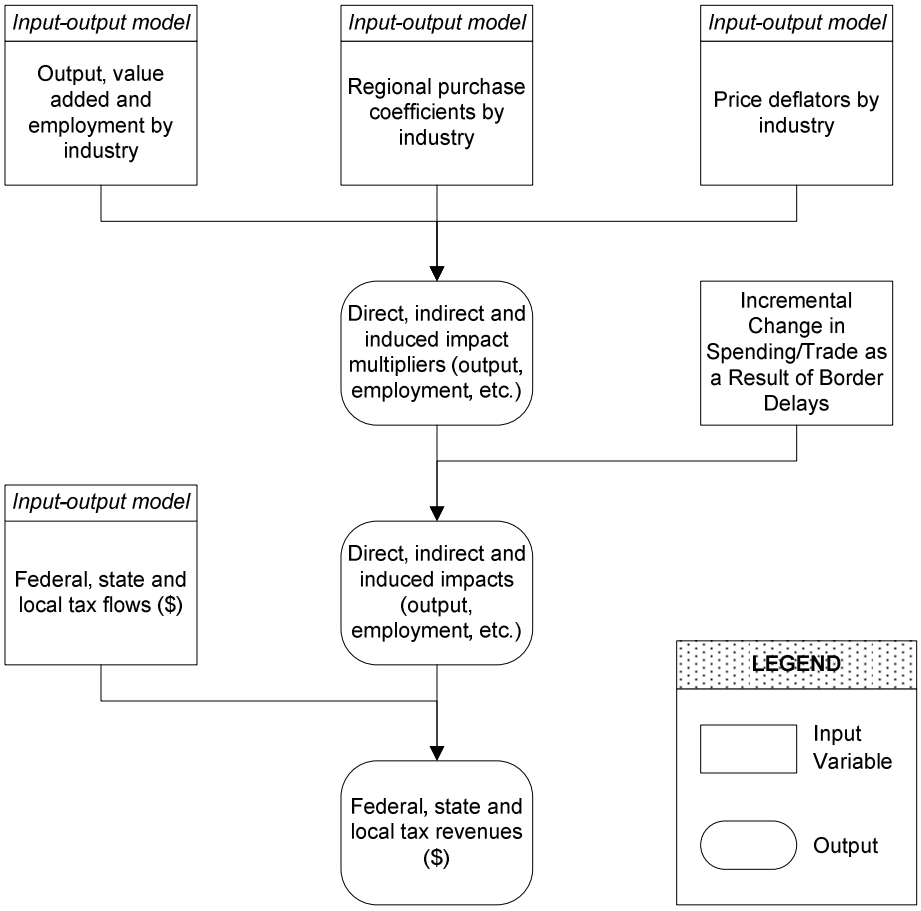
The figure below provides an overview of the economic impact estimation process. The key input to the IO model is the incremental change in spending or trade (i.e., direct effect) resulting from border delays. Multipliers are applied to this initial change to calculate the direct, indirect and induced effects, in terms of output, employment, and earnings. The IO model then uses the local and state tax rates to estimate the impact on local and state tax revenues.

[19] Type SAM multipliers are the direct, indirect and induced effects where the induced effect is based on social accounting matrix information. Type SAM multipliers capture inter-institutional transfers (in addition to all commodity flows).

[20] RPCs are ratios indicating what fraction of total demand for goods and services within a region (both by business and household) is satisfied from within the region; all remaining demand is satisfied by imports, which provide no direct economic benefit to the region. In other words, they filter-out economic leakages from the region.

[21] More recent multipliers for Baja California are not available.

Figure 14: Input-Output Analysis Overview



4. STUDY RESULTS

This chapter presents the updated results of the economic impact analysis of border delays at California's land POEs. As explained in Section 3, given the uncertainty surrounding key assumptions used in the assessment of economic impacts, the results were generated within a risk analysis framework. However, only the (mean) expected values are reported in this chapter. Section 4.1 and Section 4.2 present economic impact estimates for personal trips and freight movements respectively, on both sides of the border and at different geographic levels (local, state and national).

4.1 Economic Impacts Associated with Personal Trips

As laid out in Section 3.4, border delays affect the economy in different ways. Direct economic impacts are changes in the economy occurring as a direct consequence of personal cross-border trips foregone. Broader impacts include indirect and induced effects.

4.1.1 Direct Impacts

Because of delays at the border, San Diego County and Imperial County lost 5.99 million and 1.16 million personal trips respectively in 2008, resulting in a combined business revenue loss of $1.16 billion. This direct impact is net of additional revenue from expenditures by people who chose to forego their trips because of border delays and spent their money in their home country instead.[22] A majority of the net revenue loss occurred in the retail sector, especially in San Diego County (93 percent). At the state level, it is estimated that a combined 7.78 million trips were foregone, resulting in a $1.23 billion loss in business revenue.

Border delays were also responsible for productivity losses in the form of lost work hours and lost labor income ($29.8 million in San Diego County and $3.4 million in Imperial County) for cross-border commuters from Mexico, working in the U.S..

Table 7 and Table 8 on the next page report the (mean expected) annual direct impact of border delays at POEs in San Diego County and Imperial County respectively, with the breakdown of revenue loss by key economic sector (Retail, Recreation and Entertainment, and Food and Lodging). Note that the results for the County and the State are *not* cumulative and should thus be considered separately.

[22] Mexico, for crossers living in Mexico; or the United States, for crossers residing in the United States.

Table 7: Personal Trips, San Diego County POEs – Net Direct Impact Due to Border Delays for San Diego County and California in 2008 (in Millions of 2009 Dollars)

	Direct Impact	SAN DIEGO COUNTY	CALIFORNIA
IN THE UNITED STATES	Total Foregone Person Trips to the US	-5,998,087	-6,353,905
	Gross Revenue Loss in the US - Retail	-$952	-$1,008
	Gross Revenue Loss in the US - Recreation & Entertainment	-$9	-$10
	Gross Revenue Loss in the US - Food & Lodging	-$88	-$93
	Total Gross Revenue Loss in the US	**-$1,049**	**-$1,111**
	Add' Revenue from Foregone Trips to Mexico - Retail	$39	$56
	Add' Revenue from Foregone Trips to Mexico - Recreation & Entertainment	$3	$5
	Add' Revenue from Foregone Trips to Mexico - Food & Lodging	$20	$29
	Total Add' Revenue from Foregone Trips to Mexico	**$62**	**$90**
	Net Revenue Loss in the US - Retail	-$913	-$952
	Net Revenue Loss in the US - Recreation & Entertainment	-$6	-$5
	Net Revenue Loss in the US - Food & Lodging	-$68	-$64
	Total Net Revenue Loss in the US	**-$987**	**-$1,021**
	Number of Work Hours Lost in the US	-2,249,184	-2,382,610
	Labor Income Losses in the US	-$29.8	-$31.6

Table 8: Personal Trips, Imperial County POEs – Net Direct Impact Due to Border Delays for Imperial County and California in 2008 (in Millions of 2009 Dollars)

	Direct Impact	IMPERIAL COUNTY	CALIFORNIA
IN THE UNITED STATES	Total Foregone Person Trips to the US	-1,168,668	-1,429,014
	Gross Revenue Loss in the US - Retail	-$137	-$167
	Gross Revenue Loss in the US - Recreation & Entertainment	-$5	-$6
	Gross Revenue Loss in the US - Food & Lodging	-$52	-$64
	Total Gross Revenue Loss in the US	**-$194**	**-$237**
	Add' Revenue from Foregone Trips to Mexico - Retail	$5	$10
	Add' Revenue from Foregone Trips to Mexico - Recreation & Entertainment	$3	$5
	Add' Revenue from Foregone Trips to Mexico - Food & Lodging	$5	$10
	Total Add' Revenue from Foregone Trips to Mexico	**$12**	**$25**
	Net Revenue Loss in the US - Retail	-$132	-$157
	Net Revenue Loss in the US - Recreation & Entertainment	-$3	-$1
	Net Revenue Loss in the US - Food & Lodging	-$47	-$54
	Total Net Revenue Loss in the US	**-$182**	**-$213**
	Number of Work Hours Lost in the US	-341,904	-418,071
	Labor Income Losses in the US	-$3.4	-$4.2

Border delays also affect the Mexican economy directly, though the impact is comparatively modest. The State of Baja California lost an estimated 1.89 million trips in 2008, resulting in a total business revenue loss of $201 million, after adjusting for the revenue gains due to foregone trips to the U.S.. The retail sector alone accounted for about half of the revenue loss. In addition, more than 400 thousand hours of work (equivalent to $9 million in wages) were lost due to congestion at Baja California ports of entry. The total impact at the national level is of the same magnitude since most trips made by U.S. border crossers have a destination in Baja California.

Table 9 and Table 10 show the (mean expected) annual direct impact of border delays at POEs in San Diego County and Imperial County respectively, for the State of Baja California and Mexico separately.

Table 9: Personal Trips, San Diego County POEs – Net Direct Impact Due to Border Delays for Baja California and Mexico in 2008 (in Millions of 2009 Dollars)

	Direct Impact	BAJA CALIFORNIA	MEXICO
IN MEXICO	Total Foregone Person Trips to Mexico	-1,381,651	-1,381,651
	Gross Revenue Loss in Mexico - Retail	-$151	-$151
	Gross Revenue Loss in Mexico - Recreation & Entertainment	-$20	-$20
	Gross Revenue Loss in Mexico - Food & Lodging	-$84	-$84
	Total Gross Revenue Loss in Mexico	**-$255**	**-$255**
	Add' Revenue from Foregone Trips to the US - Retail	$131	$139
	Add' Revenue from Foregone Trips to the US - Recreation & Entertainment	$2	$2
	Add' Revenue from Foregone Trips to the US - Food & Lodging	$19	$20
	Total Add' Revenue from Foregone Trips to the US	**$153**	**$162**
	Net Revenue Loss in Mexico - Retail	-$20	-$12
	Net Revenue Loss in Mexico - Recreation & Entertainment	-$18	-$17
	Net Revenue Loss in Mexico - Food & Lodging	-$65	-$64
	Total Net Revenue Loss in Mexico	**-$103**	**-$94**
	Number of Work Hours Lost in Mexico	-364,451	-364,451
	Labor Income Losses in Mexico	-$7.7	-$7.7

Table 10: Personal Trips, Imperial County POEs – Net Direct Impact Due to Border Delays for Baja California and Mexico in 2008 (in Millions of 2009 Dollars)

	Direct Impact	BAJA CALIFORNIA	MEXICO
IN MEXICO	Total Foregone Person Trips to Mexico	-514,293	-514,293
	Gross Revenue Loss in Mexico - Retail	-$58	-$58
	Gross Revenue Loss in Mexico - Recreation & Entertainment	-$16	-$16
	Gross Revenue Loss in Mexico - Food & Lodging	-$36	-$36
	Total Gross Revenue Loss in Mexico	**-$110**	**-$110**
	Add' Revenue from Foregone Trips to the US - Retail	$8	$9
	Add' Revenue from Foregone Trips to the US - Recreation & Entertainment	$0	$0
	Add' Revenue from Foregone Trips to the US - Food & Lodging	$4	$4
	Total Add' Revenue from Foregone Trips to the US	**$12**	**$14**
	Net Revenue Loss in Mexico - Retail	-$50	-$49
	Net Revenue Loss in Mexico - Recreation & Entertainment	-$16	-$16
	Net Revenue Loss in Mexico - Food & Lodging	-$32	-$31
	Total Net Revenue Loss in Mexico	**-$98**	**-$96**
	Number of Work Hours Lost in Mexico	-38,344	-38,344
	Labor Income Losses in Mexico	-$1.3	-$1.3

4.1.2 Indirect, Induced and Total Impacts

When accounting for multiplicative effects (indirect and induced effects) the total business revenue loss to San Diego County and Imperial County amounted to $1.73 billion and $263 million respectively in 2008. In all, it is estimated that nearly 20 thousand jobs were lost in San Diego County and Imperial County combined because of delays at the border. At the state level, the combined impact was slightly larger: the output loss amounted to $2.26 billion, equivalent to a labor income loss of $913 million or a job loss of about 20,100.

Table 11 and Table 12 below provide a breakdown of the (mean expected) total economic impact of border delays in San Diego County/Imperial County and California by type of impact (direct, indirect and induced), impact category (output, labor income and employment) and key economic sector (Retail, Recreation and Entertainment, and Food and Lodging). Again, note that State results "include" County-level estimates.

Table 11: Personal Trips, San Diego County POEs – Total Economic Impact Due to Border Delays for San Diego County and California in 2008 (in Millions of 2009 Dollars)

	Impact Category	From Reduced Spending in:	Direct Impact	Indirect Impact	Induced Impact	Total Impact
SAN DIEGO COUNTY	Output (millions of U.S. dollars)	Retail	-$913	-$266	-$424	-$1,603
		Recreation & Entertainment	-$6	-$2	-$3	-$11
		Food & Lodging	-$68	-$25	-$27	-$120
		Total	**-$987**	**-$293**	**-$454**	**-$1,734**
	Labor Income (millions of U.S. dollars)	Retail	-$417	-$99	-$155	-$671
		Recreation & Entertainment	-$3	-$1	-$1	-$4
		Food & Lodging	-$24	-$9	-$10	-$43
		Total	**-$444**	**-$109**	**-$166**	**-$718**
	Employment	Retail	-10,961	-1,370	-3,014	-15,345
		Recreation & Entertainment	-82	-13	-20	-115
		Food & Lodging	-963	-122	-190	-1,276
		Total	**-12,006**	**-1,505**	**-3,224**	**-16,735**
	Impact Category	From Reduced Spending in:	Direct Impact	Indirect Impact	Induced Impact	Total Impact
CALIFORNIA	Output (millions of U.S. dollars)	Retail	-$952	-$296	-$490	-$1,739
		Recreation & Entertainment	-$5	-$2	-$3	-$10
		Food & Lodging	-$64	-$30	-$30	-$124
		Total	**-$1,021**	**-$329**	**-$523**	**-$1,872**
	Labor Income (millions of U.S. dollars)	Retail	-$435	-$107	-$173	-$714
		Recreation & Entertainment	$0	$0	$0	$0
		Food & Lodging	-$23	-$10	-$10	-$43
		Total	**-$458**	**-$117**	**-$183**	**-$758**
	Employment	Retail	-10,854	-1,238	-3,142	-15,233
		Recreation & Entertainment	-58	-10	-17	-84
		Food & Lodging	-927	-121	-166	-1,214
		Total	**-11,838**	**-1,369**	**-3,325**	**-16,531**

Table 12: Personal Trips, Imperial County POEs – Total Economic Impact Due to Border Delays for Imperial County and California in 2008 (in Millions of 2009 Dollars)

	Impact Category	From Reduced Spending in:	Direct Impact	Indirect Impact	Induced Impact	Total Impact
IMPERIAL COUNTY	Output (millions of U.S. dollars)	Retail	-$132	-$24	-$30	-$186
		Recreation & Entertainment	-$3	-$1	-$1	-$4
		Food & Lodging	-$47	-$17	-$9	-$73
		Total	**-$182**	**-$41**	**-$40**	**-$263**
	Labor Income (millions of U.S. dollars)	Retail	-$58	-$8	-$10	-$77
		Recreation & Entertainment	-$1	$0	$0	-$2
		Food & Lodging	-$16	-$5	-$3	-$24
		Total	**-$75**	**-$13**	**-$13**	**-$102**
	Employment	Retail	-1,832	-132	-237	-2,201
		Recreation & Entertainment	-55	-3	-5	-64
		Food & Lodging	-811	-94	-57	-962
		Total	**-2,698**	**-229**	**-299**	**-3,226**
	Impact Category	From Reduced Spending in:	Direct Impact	Indirect Impact	Induced Impact	Total Impact
CALIFORNIA	Output (millions of U.S. dollars)	Retail	-$157	-$49	-$81	-$287
		Recreation & Entertainment	-$1	$0	-$1	-$3
		Food & Lodging	-$54	-$26	-$25	-$105
		Total	**-$213**	**-$75**	**-$107**	**-$395**
	Labor Income (millions of U.S. dollars)	Retail	-$72	-$18	-$29	-$118
		Recreation & Entertainment	$0	$0	$0	$0
		Food & Lodging	-$20	-$8	-$9	-$37
		Total	**-$91**	**-$26**	**-$37**	**-$155**
	Employment	Retail	-1,794	-205	-519	-2,517
		Recreation & Entertainment	-16	-3	-5	-23
		Food & Lodging	-782	-103	-140	-1,025
		Total	**-2,592**	**-310**	**-664**	**-3,566**

On the Mexican side of the border, the combined total economic loss to Baja California amounts to $277 million in business output, $44 million in labor income and 2,168 jobs. At the national level, the total impact is only slightly higher ($289 million in business output, $46 million in labor income and 2,258 jobs) because most trips made by U.S. border crossers have a destination in Baja California.

Table 13 and Table 14 below provide a breakdown of the (mean expected) total economic impact of border delays in Baja California and Mexico by impact category (output, labor income and employment) and key economic sector (Retail, Recreation and Entertainment, and Food and Lodging).

Table 13: Personal Trips, San Diego County POEs – Total Economic Impact Due Border Delays for Baja California and Mexico in 2008 (in Millions of 2009 Dollars)

BAJA CALIFORNIA			
Impact Category	**From Reduced Spending in:**	**Total Impact**	
Output (millions of U.S. dollars)	Retail	-$24	
	Recreation & Entertainment	-$27	
	Food & Lodging	-$93	
	Total	**-$145**	
Labor Income (millions of U.S. dollars)	Retail	-$4	
	Recreation & Entertainment	-$4	
	Food & Lodging	-$15	
	Total	**-$23**	
Employment	Retail	-184	
	Recreation & Entertainment	-125	
	Food & Lodging	-855	
	Total	**-1,164**	

MEXICO		
Impact Category	**From Reduced Spending in:**	**Total Impact**
Output (millions of U.S. dollars)	Retail	-$16
	Recreation & Entertainment	-$29
	Food & Lodging	-$101
	Total	**-$146**
Labor Income (millions of U.S. dollars)	Retail	-$3
	Recreation & Entertainment	-$4
	Food & Lodging	-$16
	Total	**-$23**
Employment	Retail	-122
	Recreation & Entertainment	-137
	Food & Lodging	-924
	Total	**-1,183**

Table 14: Personal Trips, Imperial County POEs – Total Economic Impact Due to Border Delays for Baja California and Mexico in 2008 (in Millions of 2009 Dollars)

BAJA CALIFORNIA			
Impact Category	**From Reduced Spending in:**	**Total Impact**	
Output (millions of U.S. dollars)	Retail	-$62	
	Recreation & Entertainment	-$25	
	Food & Lodging	-$46	
	Total	**-$133**	
Labor Income (millions of U.S. dollars)	Retail	-$11	
	Recreation & Entertainment	-$4	
	Food & Lodging	-$7	
	Total	**-$21**	
Employment	Retail	-471	
	Recreation & Entertainment	-115	
	Food & Lodging	-418	
	Total	**-1,004**	

MEXICO		
Impact Category	**From Reduced Spending in:**	**Total Impact**
Output (millions of U.S. dollars)	Retail	-$66
	Recreation & Entertainment	-$27
	Food & Lodging	-$49
	Total	**-$142**
Labor Income (millions of U.S. dollars)	Retail	-$11
	Recreation & Entertainment	-$4
	Food & Lodging	-$8
	Total	**-$23**
Employment	Retail	-500
	Recreation & Entertainment	-126
	Food & Lodging	-448
	Total	**-1,074**

4.2 Economic Impacts Associated with Freight Flows

The impacts of border delays on freight movements by truck were estimated on each side of the border separately.

4.2.1 Impacts in the United States

Because of delays experienced by trucks at the border, it is estimated that San Diego County and Imperial County lost $248 million and $40 million respectively in net revenue in 2008 – after adjusting for revenue gains from local foregone trips to Mexico. When accounting for the indirect and induced effects of net revenue losses, the total impact amounts to a $412 million loss in business output and 2,256 jobs lost in San Diego County, and a $58 million loss in business output and 276 jobs lost in Imperial County.

At the state level, given that a large portion of U.S. trucks originate in the rest of California (i.e., in California but outside Imperial County or San Diego County), the combined direct revenue loss reaches $477 million. When adding the indirect and induced effects, the total revenue loss amounts to $943 million and the total job loss amounts to 4,892.

Table 15 and Table 16 below provides a breakdown of the (mean expected) total economic impact by type of impact (direct, indirect and induced), impact category (output, labor income and employment) and key economic sector (Agricultural and Food Products, Mining and Mineral Products, Machinery and Equipment, and Manufactured Goods) for each County, the State of California and the United States respectively.

Table 15: Freight, San Diego County POEs – Economic Impact Due to Border Delays for San Diego County, California and the United States in 2008 (in Millions of 2009 Dollars)

	Impact Category	From Direct Output Losses in:	Direct Impact	Indirect Impact	Induced Impact	Total Impact
SAN DIEGO COUNTY	Output (U.S. millions of dollars)	Agricultural and Food Products	-$67	-$21	-$16	-$103
		Mining and Mineral Products	-$76	-$31	-$19	-$126
		Machinery and Equipment	-$83	-$38	-$25	-$146
		Manufactured Goods	-$22	-$8	-$6	-$36
		Total	-$248	-$98	-$67	-$412
	Labor Income (U.S. millions of dollars)	Agricultural and Food Products	-$15	-$7	-$6	-$27
		Mining and Mineral Products	-$17	-$10	-$7	-$34
		Machinery and Equipment	-$23	-$13	-$9	-$45
		Manufactured Goods	-$6	-$3	-$2	-$11
		Total	-$61	-$32	-$24	-$117
	Employment (jobs)	Agricultural and Food Products	-490	-94	-87	-671
		Mining and Mineral Products	-349	-159	-121	-630
		Machinery and Equipment	-330	-206	-173	-710
		Manufactured Goods	-162	-40	-44	-246
		Total	-1,330	-499	-426	-2,256
CALIFORNIA	**Impact Category**	**From Direct Output Losses in:**	**Direct Impact**	**Indirect Impact**	**Induced Impact**	**Total Impact**
	Output (U.S. millions of dollars)	Agricultural and Food Products	-$107	-$62	-$35	-$204
		Mining and Mineral Products	-$121	-$90	-$41	-$252
		Machinery and Equipment	-$132	-$73	-$56	-$262
		Manufactured Goods	-$35	-$17	-$13	-$66
		Total	**-$396**	**-$242**	**-$146**	**-$784**
	Labor Income (U.S. millions of dollars)	Agricultural and Food Products	-$22	-$18	-$12	-$53
		Mining and Mineral Products	-$22	-$25	-$14	-$62
		Machinery and Equipment	-$41	-$24	-$20	-$85
		Manufactured Goods	-$9	-$6	-$5	-$20
		Total	**-$95**	**-$73**	**-$51**	**-$219**
	Employment (jobs)	Agricultural and Food Products	-783	-333	-225	-1,342
		Mining and Mineral Products	-413	-376	-279	-1,068
		Machinery and Equipment	-502	-304	-423	-1,228
		Manufactured Goods	-258	-81	-89	-428
		Total	**-1,956**	**-1,094**	**-1,016**	**-4,066**
UNITED STATES	**Impact Category**	**From Direct Output Losses in:**	**Direct Impact**	**Indirect Impact**	**Induced Impact**	**Total Impact**
	Output (U.S. millions of dollars)	Agricultural and Food Products	-$134	-$160	-$102	-$396
		Mining and Mineral Products	-$152	-$148	-$119	-$419
		Machinery and Equipment	-$165	-$145	-$137	-$447
		Manufactured Goods	-$44	-$41	-$38	-$123
		Total	**-$495**	**-$494**	**-$396**	**-$1,385**
	Labor Income (U.S. millions of dollars)	Agricultural and Food Products	-$21	-$42	-$34	-$97
		Mining and Mineral Products	-$31	-$43	-$40	-$114
		Machinery and Equipment	-$41	-$45	-$46	-$132
		Manufactured Goods	-$11	-$13	-$13	-$37
		Total	**-$104**	**-$143**	**-$133**	**-$380**
	Employment (jobs)	Agricultural and Food Products	-899	-1,060	-872	-2,831
		Mining and Mineral Products	-546	-744	-1,002	-2,292
		Machinery and Equipment	-644	-726	-1,155	-2,525
		Manufactured Goods	-297	-266	-323	-885
		Total	**-2,385**	**-2,795**	**-3,352**	**-8,533**

Table 16: Freight, Imperial County POEs – Economic Impact Due to Border Delays for Imperial County, California and the United States in 2008 (in Millions of 2009 Dollars)

	Impact Category	From Direct Output Losses in:	Direct Impact	Indirect Impact	Induced Impact	Total Impact
IMPERIAL COUNTY	Output (U.S. millions of dollars)	Agricultural and Food Products	-$11	-$5	-$2	-$18
		Mining and Mineral Products	-$12	-$2	-$1	-$16
		Machinery and Equipment	-$13	-$4	-$2	-$19
		Manufactured Goods	-$4	-$1	-$1	-$5
		Total	**-$40**	**-$12**	**-$6**	**-$58**
	Labor Income (U.S. millions of dollars)	Agricultural and Food Products	-$3	-$2	-$1	-$5
		Mining and Mineral Products	-$2	-$1	-$	-$3
		Machinery and Equipment	-$3	-$1	-$1	-$5
		Manufactured Goods	-$1	-$	-$	-$1
		Total	**-$9**	**-$4**	**-$2**	**-$14**
	Employment	Agricultural and Food Products	-80	-29	-15	-124
		Mining and Mineral Products	-39	-9	-2	-51
		Machinery and Equipment	-46	-19	-11	-75
		Manufactured Goods	-19	-5	-3	-26
		Total	**-183**	**-61**	**-31**	**-276**
CALIFORNIA	Impact Category	From Direct Output Losses in:	Direct Impact	Indirect Impact	Induced Impact	Total Impact
	Output (U.S. millions of dollars)	Agricultural and Food Products	-$22	-$13	-$7	-$42
		Mining and Mineral Products	-$25	-$18	-$8	-$51
		Machinery and Equipment	-$27	-$15	-$11	-$53
		Manufactured Goods	-$7	-$3	-$3	-$13
		Total	**-$80**	**-$49**	**-$30**	**-$159**
	Labor Income (U.S. millions of dollars)	Agricultural and Food Products	-$5	-$4	-$3	-$11
		Mining and Mineral Products	-$4	-$5	-$3	-$13
		Machinery and Equipment	-$8	-$5	-$4	-$17
		Manufactured Goods	-$2	-$1	-$1	-$4
		Total	**-$19**	**-$15**	**-$10**	**-$44**
	Employment	Agricultural and Food Products	-159	-68	-46	-272
		Mining and Mineral Products	-84	-76	-57	-217
		Machinery and Equipment	-102	-62	-86	-249
		Manufactured Goods	-52	-17	-18	-87
		Total	**-397**	**-222**	**-206**	**-825**
UNITED STATES	Impact Category	From Direct Output Losses in:	Direct Impact	Indirect Impact	Induced Impact	Total Impact
	Output (U.S. millions of dollars)	Agricultural and Food Products	-$27	-$33	-$21	-$80
		Mining and Mineral Products	-$31	-$30	-$24	-$85
		Machinery and Equipment	-$34	-$29	-$28	-$91
		Manufactured Goods	-$9	-$8	-$8	-$25
		Total	**-$101**	**-$100**	**-$81**	**-$281**
	Labor Income (U.S. millions of dollars)	Agricultural and Food Products	-$4	-$9	-$7	-$20
		Mining and Mineral Products	-$6	-$9	-$8	-$23
		Machinery and Equipment	-$8	-$9	-$9	-$27
		Manufactured Goods	-$2	-$3	-$3	-$8
		Total	**-$21**	**-$29**	**-$27**	**-$77**
	Employment	Agricultural and Food Products	-183	-215	-177	-575
		Mining and Mineral Products	-111	-151	-203	-466
		Machinery and Equipment	-131	-148	-235	-513
		Manufactured Goods	-60	-54	-66	-180
		Total	**-485**	**-568**	**-681**	**-1,734**

4.2.2 Impacts in Mexico

The economic impacts of truck border delays are slightly higher on the Mexican side of the border at both the state and national levels. In 2008, the total output loss amounted to $1.16 billion and 5,467 jobs were lost in Baja California. Though Machinery and Equipment was the most affected sector in terms of output losses ($653 million), Agricultural and Food Products represented nearly half of all jobs lost, because this sector is very labor intense traditionally. At the national level, the total annual output loss was $1.83 billion and 8,592 jobs were lost.

Table 17 and Table 18 below provide a breakdown of the (mean expected) total economic impact by type of impact (direct, indirect and induced), impact category (output, labor income and employment) and key economic sector (Agricultural and Food Products, Mining and Mineral Products, Machinery and Equipment, and Manufactured Goods) for Baja California and Mexico respectively.

Table 17: Freight, San Diego County POEs – Economic Impact Due to Border Delays for Baja California and Mexico in 2008 (in Millions of 2009 Dollars)

BAJA CALIFORNIA				MEXICO			
	Impact Category	From Direct Output Losses in:	Total Impact		Impact Category	From Direct Output Losses in:	Total Impact
	Output (U.S. dollars)	Agricultural and Food Products	-$244		Output (U.S. millions of dollars)	Agricultural and Food Products	-$383
		Mining and Mineral Products	-$79			Mining and Mineral Products	-$124
		Machinery and Equipment	-$538			Machinery and Equipment	-$846
		Manufactured Goods	-$102			Manufactured Goods	-$161
		Total	**-$963**			**Total**	**-$1,514**
	Labor Income (U.S. millions of dollars)	Agricultural and Food Products	-$23		Labor Income (U.S. millions of dollars)	Agricultural and Food Products	-$36
		Mining and Mineral Products	-$12			Mining and Mineral Products	-$19
		Machinery and Equipment	-$58			Machinery and Equipment	-$91
		Manufactured Goods	-$14			Manufactured Goods	-$22
		Total	**-$107**			**Total**	**-$168**
	Employment (jobs)	Agricultural and Food Products	-2,008		Employment (jobs)	Agricultural and Food Products	-3,156
		Mining and Mineral Products	-398			Mining and Mineral Products	-625
		Machinery and Equipment	-1,008			Machinery and Equipment	-1,583
		Manufactured Goods	-1,092			Manufactured Goods	-1,716
		Total	**-4,506**			**Total**	**-7,081**

Table 18: Freight, Imperial County POEs – Economic Impact Due to Border Delays for Baja California and Mexico in 2008 (in Millions of 2009 Dollars)

BAJA CALIFORNIA				MEXICO			
	Impact Category	From Direct Output Losses in:	Total Impact		Impact Category	From Direct Output Losses in:	Total Impact
	Output (U.S. dollars)	Agricultural and Food Products	-$52		Output (U.S. millions of dollars)	Agricultural and Food Products	-$82
		Mining and Mineral Products	-$17			Mining and Mineral Products	-$27
		Machinery and Equipment	-$115			Machinery and Equipment	-$180
		Manufactured Goods	-$22			Manufactured Goods	-$34
		Total	**-$206**			**Total**	**-$323**
	Labor Income (U.S. millions of dollars)	Agricultural and Food Products	-$5		Labor Income (U.S. millions of dollars)	Agricultural and Food Products	-$8
		Mining and Mineral Products	-$3			Mining and Mineral Products	-$4
		Machinery and Equipment	-$12			Machinery and Equipment	-$19
		Manufactured Goods	-$3			Manufactured Goods	-$5
		Total	**-$23**			**Total**	**-$36**
	Employment	Agricultural and Food Products	-428		Employment	Agricultural and Food Products	-673
		Mining and Mineral Products	-85			Mining and Mineral Products	-133
		Machinery and Equipment	-215			Machinery and Equipment	-338
		Manufactured Goods	-233			Manufactured Goods	-366
		Total	**-961**			**Total**	**-1,511**

5. PROJECTIONS TO 2017

5.1 Projected Economic Impacts Associated with Personal Trips

To assess the potential impact of border delays in the years to come, HDR assumed a 1.0 percent annual growth in delay (accounting for improvements in operations and technology at the existing ports of entry) and a 3.0 percent increase in volume.[23] Table 19 below shows that, under these assumptions, total economic impacts to San Diego County would increase by 45 percent between 2008 and 2017: the output loss would reach $2.53 billion and more than 24 thousand jobs would be lost. The size of the effects is about the same for California.

As a reminder, all losses are estimated relative to a free-flow border (without any wait time). Also, please note that employment losses should be understood as the total number of jobs lost over the 2008 – 2017 period, and not the number of additional persons without a job in 2017.

Table 19: Personal Trips, San Diego County POEs – Expected Economic Impact in 2017 if Border Delays Keep Growing

In 2008	SAN DIEGO COUNTY	CALIFORNIA	BAJA CALIFORNIA	MEXICO
Foregone Person Trips	-5,998,087	-6,353,905	-1,381,651	-1,381,651
Total Net Revenue Losses (millions of U.S. dollars)	-$987	-$1,021	-$103	-$94
Total Output Losses	-$1,734	-$1,872	-$145	-$146
Total Employment Losses	-16,735	-16,531	-1,164	-1,183
Total Labor Income Losses (millions of U.S. dollars)	-$718	-$758	-$23	-$23
Total Tax Revenue Losses (millions of U.S. dollars) *	-$403	-$417	n/a	n/a

In 2017	SAN DIEGO COUNTY	CALIFORNIA	BAJA CALIFORNIA	MEXICO
Foregone Person Trips	-8,721,057	-9,238,408	-1,991,406	-1,991,406
Total Net Revenue Losses (millions of U.S. dollars)	-$1,436	-$1,486	-$146	-$133
Total Output Losses	-$2,523	-$2,725	-$205	-$208
Total Employment Losses	-24,351	-24,060	-1,655	-1,678
Total Labor Income Losses (millions of U.S. dollars)	-$1,045	-$1,103	-$33	-$33
Total Tax Revenue Losses (millions of U.S. dollars) *	-$586	-$607	n/a	n/a

* U.S. only; Federal Government (excluding defense) and State and Local Government (excluding education)

As shown in Table 20, the economic impact to Imperial County is expected to increase by 44 percent by 2017: the output loss would reach $378 million and 4,638 jobs would be lost. At the state level, the output loss is expected to be 50 percent higher while the job loss is expected to be 10 percent higher.

[23] HDR assumptions; under a 3 percent annual growth assumption, the number of cross-border personal trips in 2017 would be approximately 90 million, and thus return to its 2003 level.

Table 20: Personal Trips, Imperial County POEs – Expected Economic Impact in 2017 if Border Delays Keep Growing

In 2008	IMPERIAL COUNTY	CALIFORNIA	BAJA CALIFORNIA	MEXICO
Foregone Person Trips	-1,168,668	-1,429,014	-514,293	-514,293
Total Net Revenue Losses (millions of U.S. dollars)	-$182	-$213	-$98	-$96
Total Output Losses	-$263	-$395	-$133	-$142
Total Employment Losses	-3,226	-3,566	-1,004	-1,074
Total Labor Income Losses (millions of U.S. dollars)	-$102	-$155	-$21	-$23
Total Tax Revenue Losses (millions of U.S. dollars) *	-$54	-$63	n/a	n/a

In 2017	IMPERIAL COUNTY	CALIFORNIA	BAJA CALIFORNIA	MEXICO
Foregone Person Trips	-1,680,262	-2,054,576	-740,998	-740,998
Total Net Revenue Losses (millions of U.S. dollars)	-$261	-$306	-$142	-$138
Total Output Losses	-$378	-$567	-$191	-$205
Total Employment Losses	-4,638	-5,125	-1,447	-1,549
Total Labor Income Losses (millions of U.S. dollars)	-$147	-$222	-$31	-$33
Total Tax Revenue Losses (millions of U.S. dollars) *	-$77	-$91	n/a	n/a

* U.S. only; Federal Government (excluding defense) and State and Local Government (excluding education)

5.2 Projected Economic Impacts Associated with Freight Flows

To assess the potential impact of border delays on freight in the years to come, HDR assumed a 3.0 percent annual growth in commercial vehicle border crossings and a 1 percent growth in border delays.[24] Table 21 below shows that if delays continue to grow at the San Diego – Baja California border, the economic impact to San Diego County will increase by 48 percent by 2017. For the United States, the output loss will amount to $734 million and 12,643 jobs will be lost. For Mexico, the output loss will reach $2,243 million and 10,492 jobs will be lost.

[24] HDR assumptions; growth in commercial border crossings based on average annual growth estimated over the past 10 years.

Table 21: Freight, San Diego County POEs – Expected Economic Impact if Border Delays Keep Growing

	In 2008	In 2017
In the United States		
Direct Output Losses, $million	-$496	-$734
Total Output Losses, $million	-$1,385	-$2,052
Total Employment Losses, jobs	-8,533	-12,643
Total Labor Income Losses, $million	-$380	-$564
Total Tax Revenue Losses, $million	-$161	-$238
In California		
Direct Output Losses, $million	-$396	-$587
Total Output Losses, $million	-$784	-$1,162
Total Employment Losses, jobs	-$4,066	-$6,025
Total Labor Income Losses, $million	-$219	-$325
Total Tax Revenue Losses, $million	-$96	-$143
In San Diego County		
Direct Output Losses, $million	-$248	-$367
Total Output Losses, $million	-$412	-$610
Total Employment Losses, jobs	-2,256	-3,343
Total Labor Income Losses, $million	-$117	-$173
Total Tax Revenue Losses, $million	-$48	-$72
In Mexico		
Direct Output Losses, $million	-$924	-$1,369
Total Output Losses, $million	-$1,514	-$2,243
Total Employment Losses, jobs	-$7,081	-$10,492
Total Labor Income Losses, $million	-$168	-$249
Total Tax Revenue Losses, $million	n/a	n/a
In Baja California		
Direct Output Losses, $million	-$647	-$958
Total Output Losses, $million	-$963	-$1,427
Total Employment Losses, jobs	-4,506	-6,676
Total Labor Income Losses, $million	-$107	-$158
Total Tax Revenue Losses, $million	n/a	n/a

Table 22: Freight, Imperial County POEs – Expected Economic Impact in 2017 if Border Delays Keep Growing

	In 2008	In 2017
In the United States		
Direct Output Losses, $million	-$596	-$884
Total Output Losses, $million	-$1,666	-$2,469
Total Employment Losses, jobs	-10,266	-15,212
Total Labor Income Losses, $million	-$458	-$678
Total Tax Revenue Losses, $million	-$193	-$286
In California		
Direct Output Losses, $million	-$477	-$707
Total Output Losses, $million	-$943	-$1,398
Total Employment Losses, jobs	-4,892	-7,248
Total Labor Income Losses, $million	-$263	-$390
Total Tax Revenue Losses, $million	-$116	-$172
In San Diego and Imperial Counties		
Direct Output Losses, $million	-$288	-$427
Total Output Losses, $million	-$470	-$696
Total Employment Losses, jobs	-2,532	-3,751
Total Labor Income Losses, $million	-$131	-$195
Total Tax Revenue Losses, $million	-$53	-$79
In Mexico		
Direct Output Losses, $million	-$1,121	-$1,661
Total Output Losses, $million	-$1,837	-$2,722
Total Employment Losses, jobs	-8,592	-12,731
Total Labor Income Losses, $million	-$204	-$302
Total Tax Revenue Losses, $million	n/a	n/a
In Baja California		
Direct Output Losses, $million	-$785	-$1,163
Total Output Losses, $million	-$1,169	-$1,732
Total Employment Losses, jobs	-5,467	-8,101
Total Labor Income Losses, $million	-$130	-$192
Total Tax Revenue Losses, $million	n/a	n/a

APPENDIX A: MAP OF THE CROSS-BORDER REGION

Source: SANDAG, "Map – California-Baja California Border Area," July 2002.

APPENDIX B: CALIFORNIA – MEXICO TRADE BY TRUCK (2008)

Commodity Code	Commodity Description	Exports ($ Million)	Imports ($ Million)
Total		**$16,514.4**	**$29,861.1**
1	Live animals	$2.5	$5.7
2	Meat and edible meat offal	$143.2	$79.8
3	Fish and crustaceans; mollusks and other aquatic invertebrates	$17.4	$240.4
4	Dairy produce; Birds' eggs; Natural honey; Edible products of animal origin; not elsewhere included	$78.6	$29.6
5	Products of animal origin; not elsewhere specified or included	$5.3	$2.8
6	Live trees and other plants; Bulbs; roots and the like; Cut flowers and ornamental foliage	$17.7	$14.8
7	Edible vegetables and certain roots and tubers	$111.0	$961.8
8	Edible fruit and nuts; Peel of citrus fruit or melons	$198.3	$705.7
9	Coffee; tea; mate and spices	$3.9	$3.9
10	Cereals	$14.7	$8.9
11	Products of the milling industry; Malt; Starches; inulin; Wheat gluten	$34.3	$19.0
12	Oil seeds and oleaginous fruits; Miscellaneous grains; Seeds and fruit; Industrial plants	$118.7	$35.7
13	Lac; Gums; Resins and other vegetable saps and extract	$8.0	$4.2
14	Vegetable plaiting materials; Vegetable products not elsewhere specified or included	$0.1	$8.5
15	Animal or vegetable fats and oils and their cleavage products; Prepared edible fats; Animal waxes	$31.1	$25.2
16	Preparations of meat; of fish; or of crustaceans; mollusks or other aquatic invertebrates	$48.4	$12.3
17	Sugars and sugar confectionery	$19.5	$64.9
18	Cocoa and cocoa preparations	$72.1	$22.5
19	Preparations of cereals; flour; starch or milk; Bakers' wares	$46.4	$52.7
20	Preparations of vegetables; fruit; nuts; or other parts of plants	$49.6	$155.9
21	Miscellaneous edible preparations	$387.8	$77.7
22	Beverages; spirits and vinegar	$57.0	$123.8
23	Residues and waste from the food industries; Prepared animal feed	$25.3	$1.2
24	Tobacco and manufactured tobacco substitutes	$1.4	NA
25	Salt; Sulfur; Earths and stone; Plastering materials; lime and cement	$8.9	$6.0
26	Ores; slag and ash	$0.2	$0.0
27	Mineral fuels; mineral oils and products of their distillation; Bituminous substances; Mineral waxes	$158.5	$1.3
28	Inorganic chemicals; Organic or inorganic compounds of precious metals; of rare-earth metals	$33.2	$11.6
29	Organic chemicals	$52.6	$5.5
30	Pharmaceutical products	$24.9	$22.7
31	Fertilizers	$34.9	$0.4
32	Tanning or dyeing extracts; Tannins and their derivatives; Dyes; pigments and other coloring matter	$114.9	$15.8
33	Essential oils and resinoids; Perfumery; cosmetic or toilet preparations	$57.7	$49.5
34	Soap; organic surface-active agents; washing preparations; lubricating preparations; prepared waxes	$39.8	$121.3
35	Albuminoidal substances; Modified starches; Glues; Enzymes	$53.7	$5.3
36	Explosives; Pyrotechnic products; Matches; Pyrophoric alloys; Certain combustible preparations	$1.0	$0.5
37	Photographic or cinematographic goods	$38.1	$12.2

Commodity Code	Commodity Description	Exports ($ Million)	Imports ($ Million)
38	Miscellaneous chemical products	$117.8	$39.4
39	Plastics and articles thereof	$1,462.1	$485.6
40	Rubber and articles thereof	$201.6	$71.2
41	Raw hides and skins; other than fur skins	$16.3	$2.3
42	Articles of leather; Saddlery and harness; Travel goods; handbags and similar containers	$27.2	$31.6
43	Fur skins and artificial fur; Manufactures thereof	$0.3	$0.4
44	Wood and articles of wood; Wood charcoal	$198.9	$73.5
45	Cork and articles of cork	$2.2	NA
46	Manufactures of straw; of esparto or of other plaiting materials; Basket ware and wickerwork	$0.9	$1.8
47	Pulp of wood or of other fibrous cellulosic material; Waste and scrap of paper or paperboard	$20.6	$5.5
48	Paper and paperboard; Articles of paper pulp; of paper or of paperboard	$611.0	$245.7
49	Printed books; newspapers; pictures and other products of the printing industry; Manuscripts	$92.0	$36.5
50	Silk	$0.9	NA
51	Wool; fine or coarse animal hair; Horsehair yarn and woven fabric	$1.4	$0.0
52	Cotton	$38.1	$24.3
53	Other vegetable textile fibers; Paper yarn and woven fabrics of paper yarn	$0.6	$0.0
54	Man-made filaments	$50.1	$6.1
55	Man-made staple fibers	$43.1	$2.9
56	Wadding; felt and nonwovens; Special yarns; Twine; cordage; ropes and cables and articles thereof	$37.9	$6.6
57	Carpets and other textile floor coverings	$9.8	$2.3
58	Special woven fabrics; Tuffed textile fabrics; Lace; Tapestries; Trimmings; Embroidery	$59.8	$0.3
59	Impregnated; coated; covered or laminated textile fabrics; Textile articles for industrial use	$26.4	$30.1
60	Knitted or crocheted fabrics	$199.3	$23.4
61	Articles of apparel and clothing accessories; knitted or crocheted	$226.6	$742.9
62	Articles of apparel and clothing accessories; not knitted or crocheted	$68.6	$339.1
63	Other made-up textile articles; Needle craft sets; Worn clothing and worn textile articles; rags	$43.1	$75.5
64	Footwear; gaiters and the like; Parts of such articles	$19.2	$64.1
65	Headgear and parts thereof	$6.3	$11.4
66	Umbrellas; sun umbrellas; walking sticks; seat sticks; whips; riding crops and parts thereof	$0.8	$0.3
67	Prepared feathers and down and articles made of feathers or of down; artificial flowers	$3.7	$2.6
68	Articles of stone; plaster; cement; asbestos; mica or similar materials	$81.0	$114.5
69	Ceramic products	$13.5	$44.8
70	Glass and glassware	$82.1	$97.6
71	Natural or cultured pearls; precious or semiprecious stones; precious metals; articles thereof	$40.9	$12.0
72	Iron and steel	$295.7	$75.4
73	Articles of iron or steel	$528.7	$192.3
74	Copper and articles thereof	$132.3	$99.9
75	Nickel and articles thereof	$60.2	$3.0
76	Aluminum and articles thereof	$329.3	$127.8
78	Lead and articles thereof	$5.6	$4.0
79	Zinc and articles thereof	$26.9	$2.2

Commodity Code	Commodity Description	Exports ($ Million)	Imports ($ Million)
80	Tin and articles thereof	$3.9	$0.5
81	Other base metals; Cermets; Articles thereof	$41.2	$0.8
82	Tools; implements; cutlery; spoons and forks; of base metal; Parts thereof of base metal	$42.6	$17.2
83	Miscellaneous articles of base metal	$258.2	$542.4
84	Nuclear reactors; boilers; machinery and mechanical appliances; parts thereof	$2,789.7	$3,328.1
85	Electrical machinery and equipment and parts thereof; Sound recorders and reproducers	$3,535.5	$14,658.1
86	Railway or tramway locomotives; rolling stock and parts thereof; railway fixtures and parts thereof	$1.5	$40.6
87	Vehicles; other than railway or tramway rolling stock; and parts and accessories thereof	$1,283.6	$1,666.1
88	Aircraft; spacecraft; and parts thereof	$27.2	$117.2
89	Ships; boats; and floating structures	$2.6	$0.1
90	Optical; photographic; cinematographic; measuring; checking; precision; medical instruments	$792.5	$1,617.2
91	Clocks and watches and parts thereof	$5.1	$0.9
92	Musical instruments; Parts and accessories of such articles	$7.9	$7.7
93	Arms and ammunition; Parts and accessories thereof	$1.3	$1.4
94	Furniture; Bedding; mattress supports; cushions and similar stuffed furnishings; Lighting fittings	$167.3	$682.5
95	Toys; games and sports equipment; Parts and accessories thereof	$180.9	$299.0
96	Miscellaneous manufactured articles	$56.6	$46.7
97	Works of art; collectors' pieces and antiques	$0.8	$0.4
98	Special classification provisions	$22.1	$826.0

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Data, based on data from the Census Foreign Trade Statistics Program

APPENDIX C: MAIN MODEL MODIFICATIONS AND ENHANCEMENTS

Below is a list of the main modifications and enhancements made to the original border economic impact models.

- The original personal trip and freight models developed for SANDAG and IVAG were combined into a single spreadsheet model to enhance ease of use.
- The interface was improved accordingly. In particular, a model navigation matrix was created with links to key input and output sheets.
- The labels of some cells and/or variables were modified to enhance clarity.
- Summary tables and charts for total combined impacts were added.
- A large number of cells were locked to prevent any changes. Cells that can be modified were color-coded as follows: safe to update in blue; update with caution in rose.
- All intermediate sheets were hidden, as well as sheets containing background information and data.
- Border delays can now be estimated using any of the three following methods:
  - Input delay growth;
  - Input border traffic volume growth; or
  - Input values of key drivers of border traffic, such as population growth, variations in the exchange rate or regional unemployment.
- The average value per truck was revised so as to distinguish loaded trucks from empty trucks (based on border crossing data from the Bureau of Transportation Statistics)
- Key model inputs on border crossings, trade and wait times were updated with the most recent available data.
- Multipliers were also updated with the most recent (2007) IMPLAN data for San Diego County, Imperial County and the State of California.
- Assumptions regarding trip purpose were modified so that different sources can be used.
- Wait time estimates for freight were revised based on a survey conducted by HDR for the U.S. Department of Commerce at Otay Mesa in 2007.

APPENDIX D: REFERENCES AND DATA SOURCES

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